

A linguistic comparison of twelve Arabic versions of the Diabetes Treatment Satisfaction Questionnaire (DTSQs version): exploring the feasibility of regional rather than country-specific questionnaires

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Introduction and Aims

Arabic is the official language in 28 countries, which are geographically classified into five regional groups: **Levant, Gulf, Egypt, North Africa, and Iraq** (Eberhard et al., 2023) (Figure 1).

Figure 1: The five regional groups of countries where Arabic is the official language



To promote conceptual/cultural equivalence of Patient Reported Outcome Measures (PROMs), a rigorous linguistic validation process is followed when adapting an existing questionnaire for use in another country (Felici et al., 2011) (<https://healthpsychologyresearch.com/linguistic-validation/>).

Adaptation of an existing questionnaire by one native speaker > one back translation > psychologist and/or clinician review > cognitive debriefing interviews with patients > proofreading

Figure 2: The four countries in the Levant regional group



Aim: To examine the feasibility of developing a Levantine regional Arabic PROM for use in four Levantine countries (**Syria, Lebanon, Jordan, and Israel**) (Figure 2).

Methods

The extent and type of linguistic modifications were recorded in 12 linguistically validated Arabic Diabetes Treatment Satisfaction Questionnaire-status versions (DTSQs; Bradley, 1994), four of which were Levantine, compared with the four Levantine country questionnaires (Syria, Lebanon, Jordan, and Israel) (Table 1).

Country	Language group
Syria	Levant
Lebanon	Levant
Jordan	Levant
Israel	Levant
United Arab Emirates	Gulf
Qatar	Gulf
Kuwait	Gulf
Saudi Arabia	Gulf
Algeria	North Africa
Tunisia	North Africa
Morocco	North Africa
Egypt	Egypt

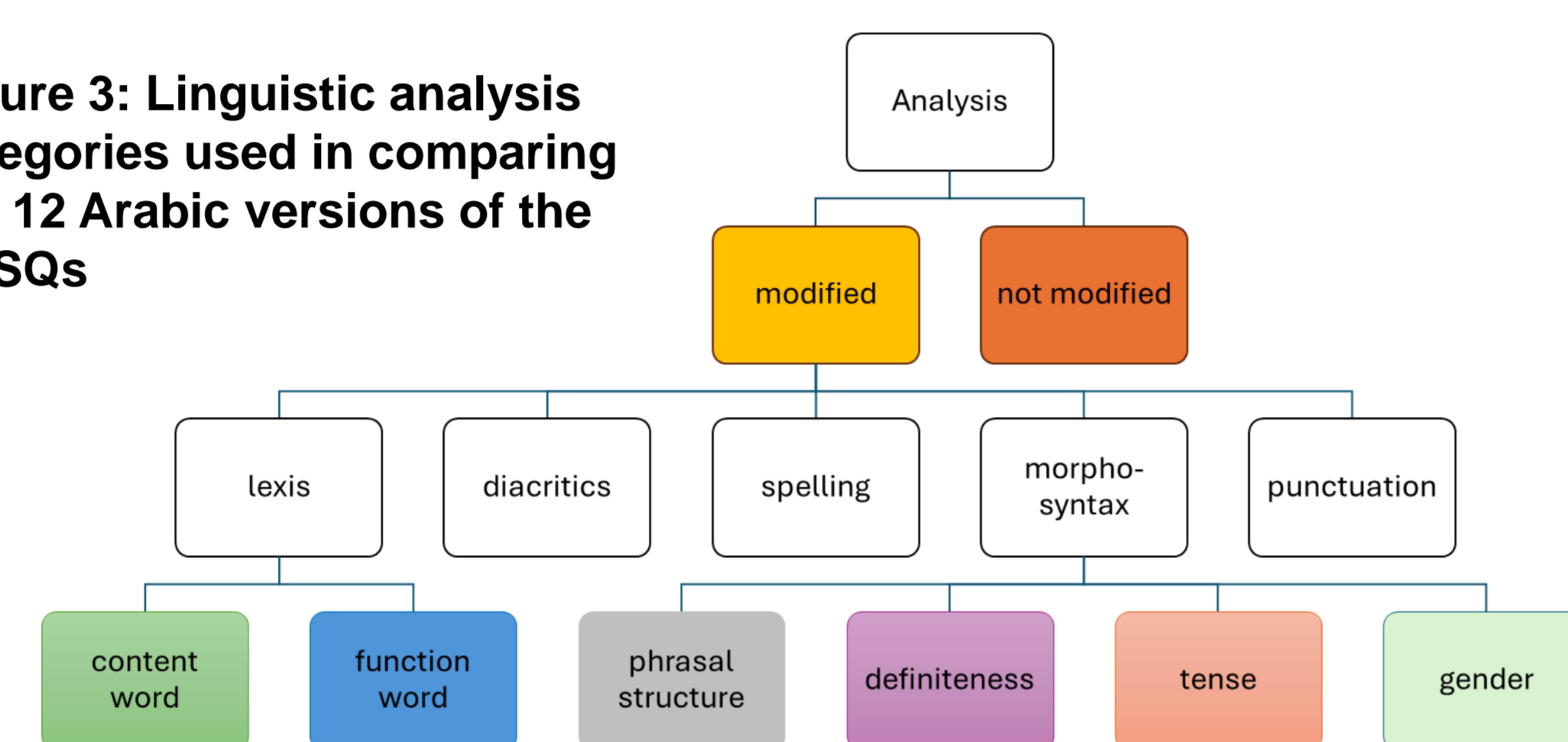
Table 1: Countries and regions for which the Diabetes Treatment Satisfaction Questionnaire has already been linguistically validated.

Analysis

Analysis

- ❖ The DTSQs text was compared word by word across the 12 country versions (including Levantine), starting with the first Arabic questionnaire for Saudi Arabia which had 166 words.
- ❖ The DTSQs text was also compared word by word across the subset of four Levantine versions, recording modifications.
- ❖ Figure 3 presents the three stages of the analysis: overall modifications, modifications by linguistic type, and sub-linguistic categories.

Figure 3: Linguistic analysis categories used in comparing the 12 Arabic versions of the DTSQs



Results

Overall modification

Figure 4 shows the percentage of modified words across the 12 questionnaires, compared to the four Levantine questionnaires. A Chi-Square test showed that the DTSQs text had significantly more modifications (89%) in the 12 country-specific versions compared to the subset of four Levantine versions (73%) ($\chi^2[1,2655]=87.47$, $P<.001$), with most modifications in the Levantine versions being for Israel (40%).

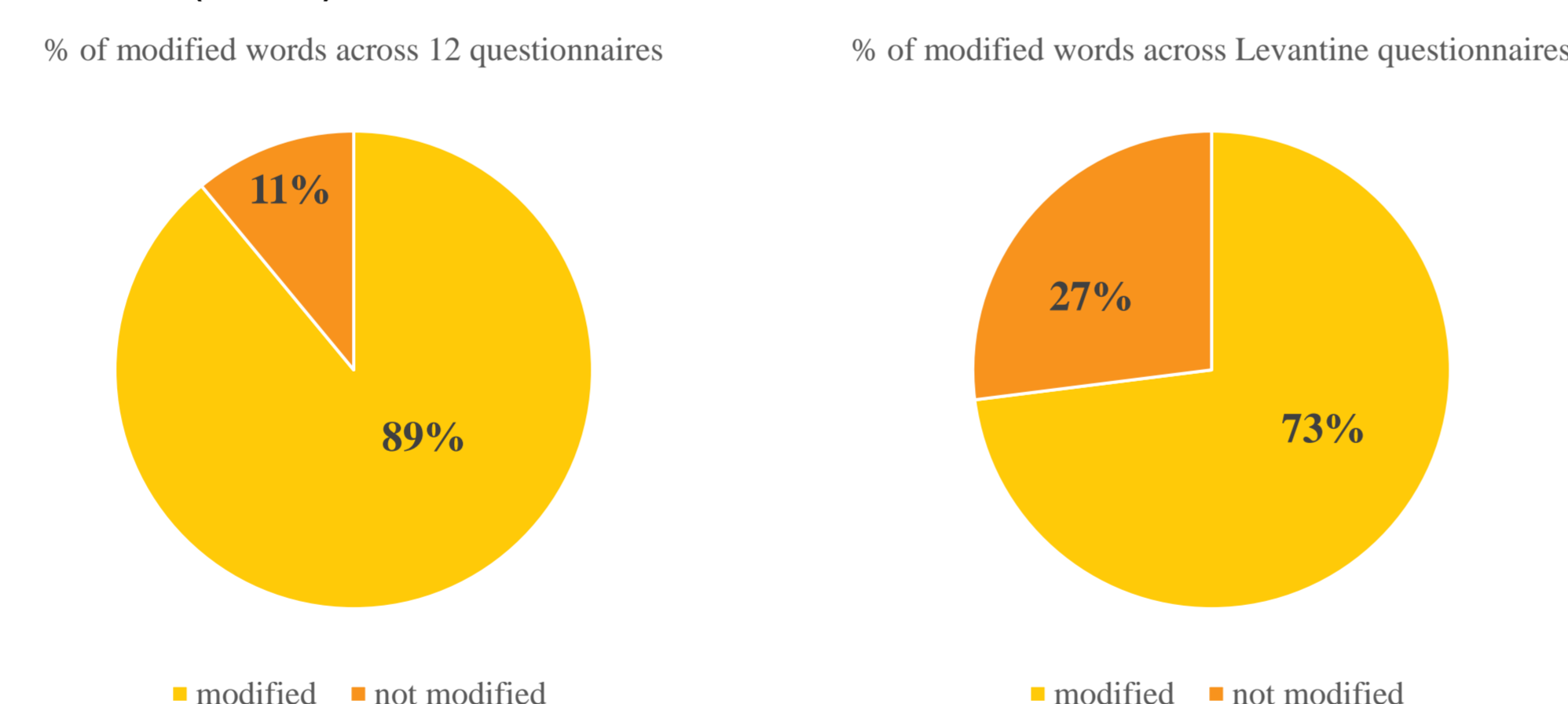


Figure 4: Percentage of modified words for all 12 Arabic DTSQs vs four Levantine DTSQs.

Modifications by linguistic type

The extent of all types of linguistic modifications was significantly greater across the 12 country-specific versions compared to the subset of four Levantine versions (Figure 5):

- ❑ **lexis** ($\chi^2[1,2655]=15.39$, $P<.001^*$),
- ❑ **morpho-syntax** ($\chi^2[1,2655]=86.70$, $P<.001^*$),
- ❑ **diacritics** ($\chi^2[1,2655]=17.27$, $P<.001^*$),
- ❑ **spelling** ($\chi^2[1,2655]=17.84$, $P<.001^*$),
- ❑ **punctuation** ($\chi^2[1,2655]=6.39$, $P=.012^*$).

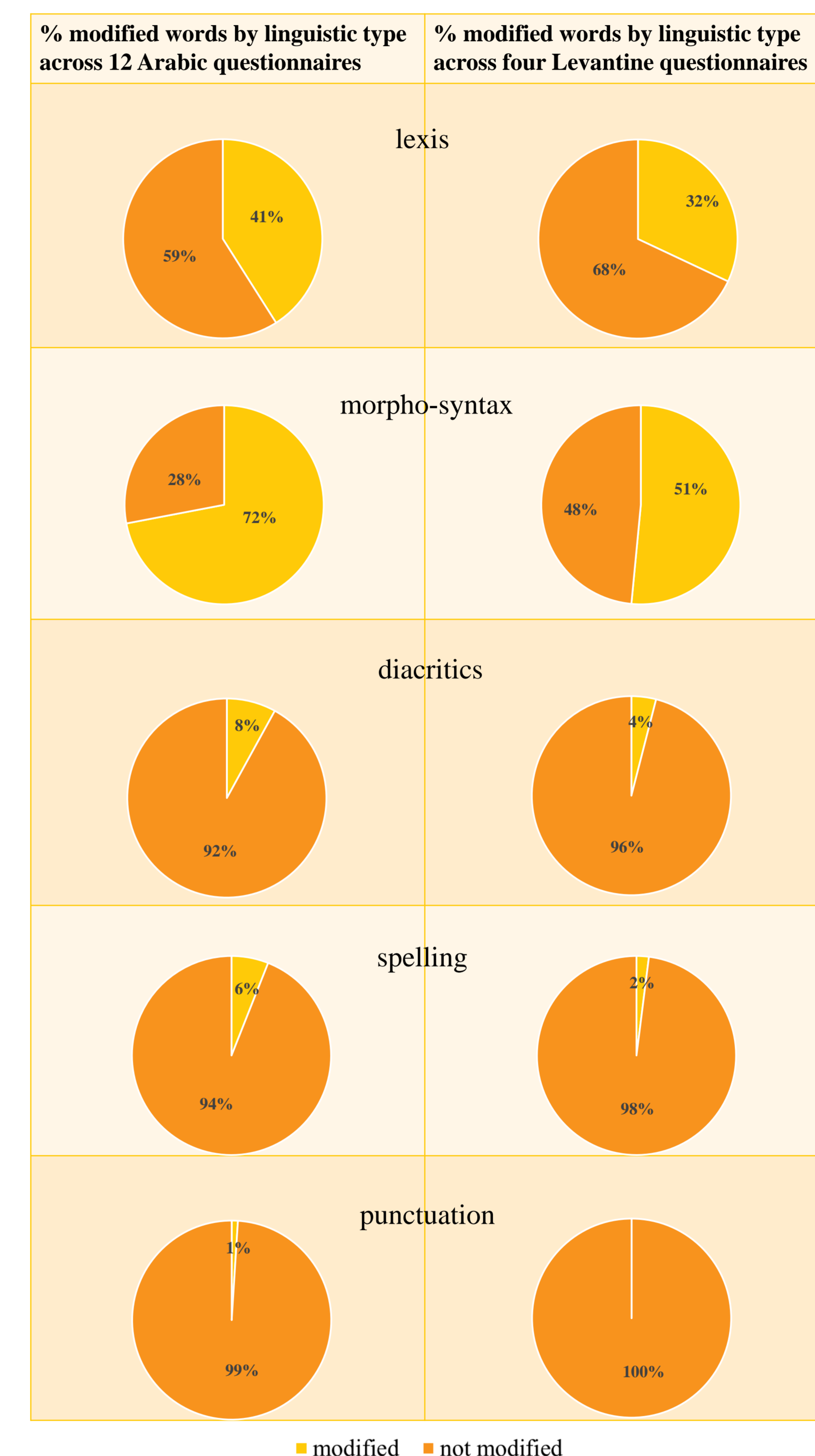


Figure 5: Percentage of each type of linguistic modification for all 12 Arabic DTSQs vs four Levantine DTSQs.

Conclusions

- The 12 Arabic country-specific versions and the subset of four Levantine country-specific versions of the DTSQs had similar linguistic modifications, with changes in **morpho-syntax** being the most common and changes in **lexis** being the next most common.
- Although Standard Arabic was used for all 12 Arabic DTSQs versions, most of the text was modified, which suggests that using a single **macro-Arabic PROM** is unlikely to be acceptable to all.
- Although the four Levantine versions had significantly greater similarity than was found across the 12 Arabic country-specific versions, there were, nevertheless, a great number of modifications. A single regional Arabic DTSQs, which is acceptable for the four Levant countries, is unlikely without the need for comprehensive harmonization across the four Levantine countries with linguists from all four countries involved.
- A regional Arabic DTSQs for the Levant region is likely to be more achievable than an Arabic version for use in all 12 Arab-speaking countries. However, it is simpler, quicker and more economical to produce country-specific versions.

Lexis modifications

Lexis modifications in **content words** and morpho-syntax modifications in **phrasal structure** were the main types of linguistic modifications in both groups (Figure 6 and Figure 7).

Content words: Words that have a meaning, and can be a noun, a verb, an adjective, an adverb ... etc.

Examples: **Questionnaire - convenient - diet**

Function words: Grammatical words, such as auxiliary verbs, modals, conjunctions, prepositions ... etc.

Examples: **not - for - and**

Phrasal structure: Includes word order, word class, adding/deleting phrases and subordinate clauses, and changing phrase type (e.g. noun phrase > prepositional phrase).

Examples: which they receive (in three versions only)
treatment - with the treatment - with your treatment
The following questions are concerned with -
concerned with, the following questions are

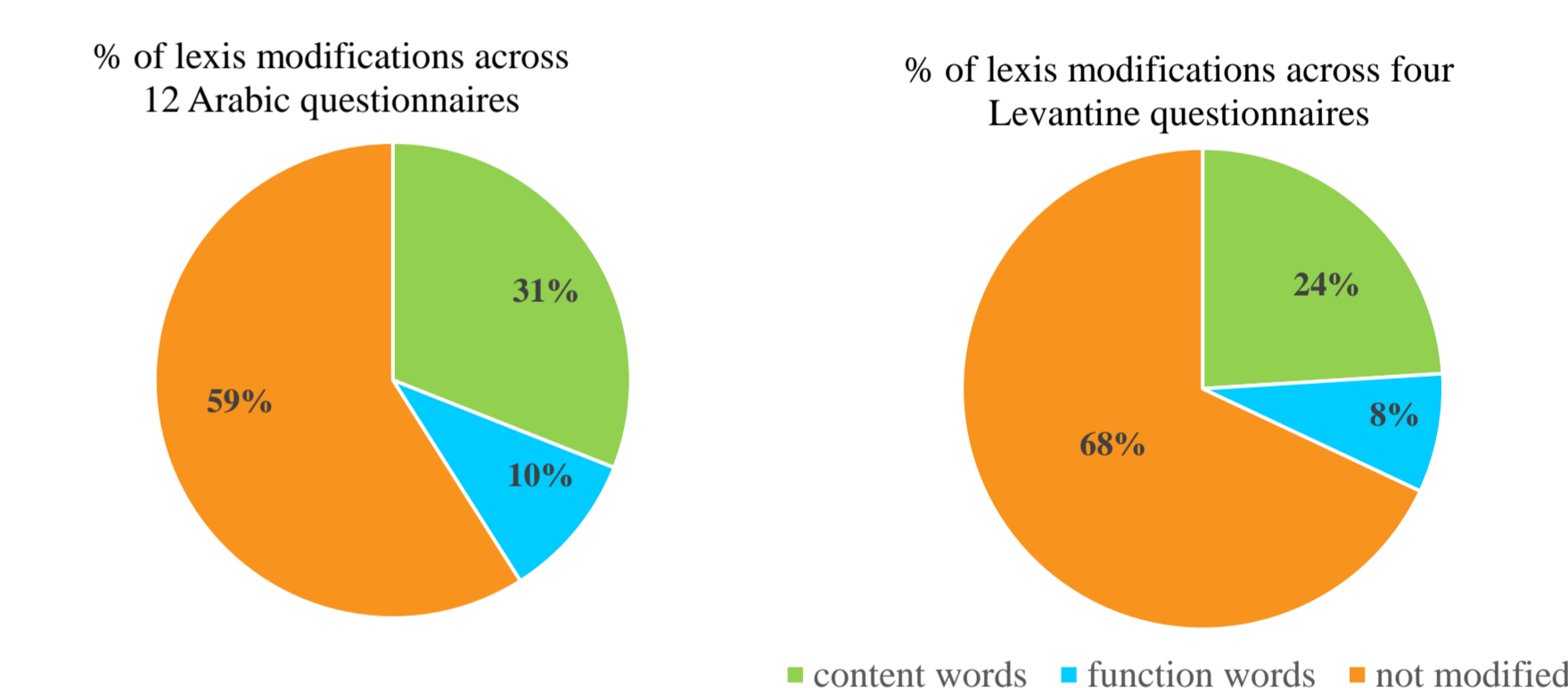


Figure 6: Percentage of lexis modifications across all 12 Arabic DTSQs vs four Levantine DTSQs.

Morpho-syntax modifications

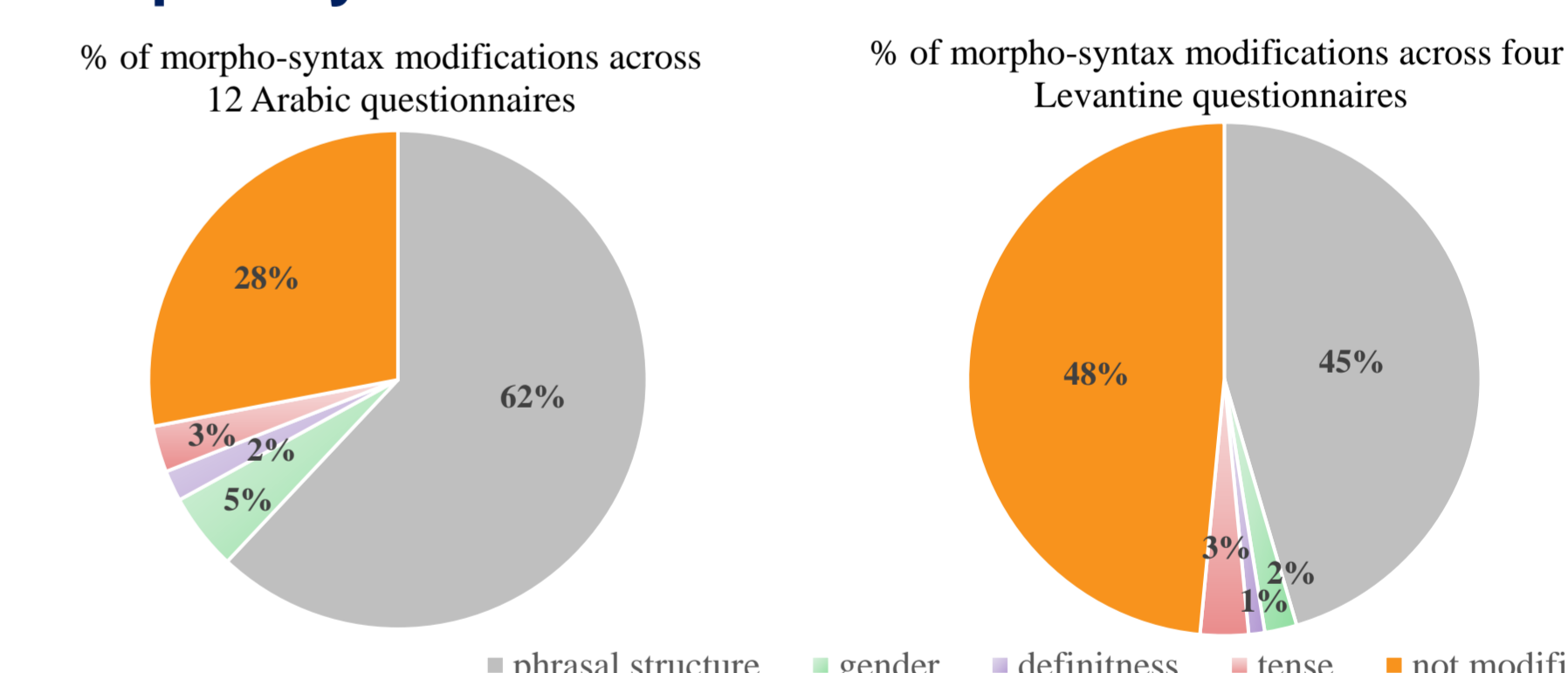


Figure 7: Percentage of morpho-syntax modifications across all 12 Arabic DTSQs vs four Levantine DTSQs.

References

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For access to the DTSQ and other questionnaires please visit:
www.healthpsychologyresearch.com

