

# The cultural adaptation of quantity judgment tasks in Ghanaian English and Akan

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## Abstract

The phenomenon of mass and countability is multifaceted and has been controversially discussed in many disciplines. For linguistics, differences in the morphosyntactic marking of the distinction cross-linguistically, and its cross-cultural ontological-semantic conceptualization are particularly interesting. However, most studies into mass and countability have focused on (American) English, and, to some extent European and Asian languages. African languages and contexts have as yet been neglected by research

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into countability, and the methodological tools employed to study it do not account for the ambient cultural contexts. This paper presents the results of a quantity judgment task designed according to Barner and Snedeker's (2005) experiment for American English speakers, conducted in Ghanaian English and Akan. The Ghanaian experiments reveal important concerns regarding the stimuli and their applicability, especially to Akan culture. Thus, inspired by other studies into the semantics of Akan, a new set of stimuli is suggested in order to investigate mass and countability contrastively in Ghanaian English and Akan. In this vein, they emphasize the insufficiency of translations with regard to (psycho)linguistic experiments and the importance of proper cultural adaptation.

**Keywords:** countability, semantics, methods, Akan, Ghanaian English

### Résumé

Le phénomène de massivité et de comptabilité a de multiples facettes, et a fait l'objet de controverses dans de nombreuses disciplines. En linguistique, les différences au sein du marqueur morphosyntaxique de la distinction interlinguistique et sa conceptualisation ontologico-sémantique et interculturelle sont particulièrement intéressantes. Cependant, la plupart des études portant sur la massivité et de comptabilité se sont focalisées sur l'anglais (américain) et, dans une certaine mesure, sur les langages européens et asiatiques. Les langues et contextes africains sont toujours négligés par la recherche en comptabilité, et les outils méthodologiques employés pour les étudier ne tiennent pas compte des contextes culturels ambiants. Cet article présente les résultats d'une évaluation quantitative menée selon l'expérimentation réalisée en anglais ghanéen et en akan par Barner et Senedeker (2005) pour les anglophones américains. Les expérimentation ghanéennes révèlent d'importantes préoccupations concernant les stimuli et leur applicabilité, en particulier dans la culture Akan. Ainsi, inspiré par d'autres études sur la sémantique akan, ce travail suggère un nouvel ensemble de stimuli permettant d'analyser de manière contrastée la massivité et comptabilité de l'anglais ghanéen et de l'akan. En ce sens, ils insistent sur les lacunes des traductions en ce qui concerne les expériences (psycho) linguistiques et l'importance d'une sérieuse adaptation culturelle.

**Mots clés:** comptabilité, sémantique, méthodes, akan, anglais ghanéen

## Introduction

The phenomenon of mass and countability is multifaceted and has been discussed in many disciplines, such as philosophy, psychology and linguistics. For the latter, differences in its grammatical marking cross-linguistically, and its cross-cultural ontological-semantic conceptualization are particularly interesting. Given the large differences in both areas (e.g., Chierchia 2010; Kulkarni et al. 2013; Rothstein 2017), the acquisition of the grammatical rules concerning mass and countability in a second or foreign language is complicated (Mohr 2017). This particularly applies to the acquisition of English, the most widely spoken global lingua franca, with 1,079,609,320 second language (L2) speakers, according to the *Ethnologue* (Eberhard et al. 2022). Indeed, the unstandardized pluralization of English mass nouns is an oft-cited phenomenon in the literature on L2 and L3 Englishes (e.g., Mesthrie & Bhatt 2008; Kortmann & Lunkenheimer 2013), particularly with reference to the African continent (Huber 2012). Empirical investigations into the motivation for this phenomenon remain scarce though. Often, acquisition-related processes like overgeneralization are put forth in order to account for the pluralization of mass nouns in non-native speakers (e.g., Sharma 2012). However, a more comprehensive account of pluralization phenomena in non-native Englishes seems more fruitful (see Mesthrie & Bhatt 2008: 54), especially given that there is a certain group of mass nouns, called object-mass nouns or collectives, that is more frequently pluralized than others (Mohr 2022). An investigation into the semantic and cultural conceptualization of these nouns is necessary.

This paper presents a discussion of the semantics of mass and count nouns in Ghanaian English, and Akan, the second “principal language” of Ghana according to the *Ethnologue* (Eberhard et al. 2022) and a language of wider communication in several parts of the country. Based on the results of a quantity judgment task which was first introduced by Barner and Snedeker (2005) and subsequently replicated with non-native speakers of English in Asia (e.g., Inagaki & Barner 2009 on Japanese L2 English speakers, who were also tested in English), the central aspect of this article is the cultural adjustment of the experiment to the Ghanaian context with regard to the country’s two principal languages. First results were reported in Mohr (2018, 2022) and turned out rather obfuscated. This article shall serve as a methodological discussion in which we suggest that this is due to the failed adaptation of the experiment stimuli, similar to techniques applied in studies such as Agyepong’s (2017), for a repetition of the task in Ghana and possibly other African contexts.

Ultimately, this would contribute to a better understanding of the mass–count distinction in Akan, the motivation for the unstandardized pluralization of mass nouns in Ghanaian English and non–native Englishes in general, and eventually to an improved comprehension of mass and count cross–linguistically and cross–culturally.

### **The sociolinguistic situation of Ghana**

Considered to be a multilingual country, Ghana is estimated to have close to 83 languages, according to the *Ethnologue* (Eberhard et al. 2022). This figure comprises 73 indigenous and ten non–indigenous languages. Due to colonialism, English became and still is the official language of Ghana. Thus, it is used as medium of instruction in education, as well as all governmental and non–governmental proceedings. The *Ethnologue* lists 10.7 million users according to the 2010 housing census (Eberhard et al. 2022), and given its importance in school contexts and for social mobility, many parents in urban and peri–urban Ghana use English as a home language with their children nowadays (Quarcoo 2006; Ofori & Albakry 2012; Huber 2014; Dako & Quarcoo 2017).

In the media, English is also widely used (Guerini 2008; Dako 2012), although other languages are used for broadcasting as well. Though not officially acknowledged, Akan and Hausa, to an extent, are considered the *lingua francas* of the country. Osam (2004: 3), for instance, opines that, “even though no official declaration has been made, Akan is growing in its influence as a potential national language, especially since people who speak other languages sometimes use it as a *lingua franca*.” Altogether, the *Ethnologue* reports 9.1 million Akan speakers in Ghana, of which 8.1 million are first language (L1) and 1 million second language (L2) users (Eberhard et al. 2022). However, other estimates are much higher, suggesting 70% of the population speak Akan (Dako & Quarcoo’s 2017: 21).

In Ghana, Akan covers a wide range of socio–cultural domains in terms of its usage. As a language, it has three mutually intelligible dialects: Asante–Twi, Akuapem–Twi and Mfantse. All three dialects are officially recognized as languages of education. Thus, where children have them as their L1, all public schools use them as the medium of instruction, especially during the first three years of basic education (lower primary). Akan is continued as a course at the Junior High School level, after which pupils are examined on the language before proceeding to the Senior High Schools. Akan is also taught as an elective course at the Senior High Schools. At the University level, students may take Akan as a course in Linguistics (Dolphyne 1988; Osam 2004; Agyekum 2012).

## Mass and countability

The mass–count distinction in general has been conceptualized in different ways. While it has been argued to be a general perceptual distinction between objects and stuff (Link 1983), more recent accounts have convincingly disproven this in view of the immense cross–linguistic and intra–lingual variability in its encoding (Rothstein 2017). Linguistically, two broad types of languages can be distinguished, namely plural languages that morphologically mark nouns for number and possess a grammatical mass–count distinction, and transnumeral languages that do not mark nouns for number and do not possess a distinction between mass and count (Chierchia 1998). English is an example of a plural language, while Mandarin Chinese is an example of a transnumeral language. In the latter, nominal number is inferred from the context and when nouns are combined with numerals, a numeral classifier is obligatory. This is shown in example (1) from Mohr (2018: 50).

1.    yi           pi           ma  
       one         CL         horse  
       ‘one horse’

African languages have not been studied extensively concerning their mass–count distinction, although some studies have shown that, especially due to many languages’ noun class systems, it is different from most Indo–European languages (Dimmendaal 2000). Empirical investigations into the distinction in African languages for more accurate typologies of countability across languages are hence necessary and the present paper aims at contributing to studying these.

### *Mass and countability in English*

A description of the mass–count distinction in English, which is claimed to be the main distinction of the noun class in the language (Carter & McCarthy 2007), is closely linked to rules of number marking. Generally, English is a plural language, i.e., number is marked on nouns morphologically, usually by suffixation. The regular plural suffix is *–s* as in *cat* > *cats*, except in nouns ending in /s/ or /ʃ /, which form their plural in *–es*, such as *match* > *matches*. Apart from this regular formation, there are irregular plurals formed with irregular endings, such as *child* > *children*, stem vowel alternation as in *goose* > *geese*, or according to foreign plural formation rules such as *phenomenon* > *phenomena*. All these rules can be applied to count nouns, which semantically refer to individuated entities (see Barner & Snedeker 2005).<sup>1</sup>

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1 Further, there are nouns which do not have a plural form, such as *deer* or *series*, but can occur with singular or plural verb agreement and indefinite determiners (a deer) and numerals (three deer) to indicate number.

There is also a group of nouns that cannot be marked for plural (see example 2) but can neither be combined with indefinite determiners (see example 3) nor with numerals (see example 4), i.e. mass nouns.

2. *Her knowledges were astonishing.*
3. *I have a new information.*
4. *There are three sands on the floor.*

Usually, mass nouns refer to less individuated entities (Everett 2013: 201) and are hence semantically different from count nouns.

Despite their differences, there is a certain elasticity between the mass and count categories (Alexiadou 2011). Thus, mass nouns can, in certain contexts, be used in a count reading and vice versa. Examples are provided below (modified from Wiese 2012: 69).

- |   |         |
|---|---------|
| 5. <i>He likes cheese.</i>                        | [mass]  |
| <i>The best cheeses are from the Netherlands.</i> | [count] |
| 6. <i>There is an apple in the basket.</i>        | [count] |
| <i>I like apple in my cake.</i>                   | [mass]  |

These mechanisms have been called the “Universal Sorter” and the “Universal Grinder” (Pelletier 1975; Bunt 1985) and are frequently encountered in English and even more so in languages where the mass–count distinction is less pronounced (Gathercole 1997).

Apart from these two broad categories of nouns, there is a third class which possesses properties of both other groups. Doetjes (2012) mentions that this group of nouns usually only occurs in plural languages like English. In the literature, this group has been referred to using various terms; in this paper it is referred to as “object–mass nouns” (e.g., Barner & Snedeker 2005). These nouns usually refer to individuated entities like count nouns, but exhibit the morphosyntactic behavior of mass nouns. It has been suggested that they are “functional collectives” (Grimm & Levin 2011: 29), denoting a set of entities that function together in an event. Examples from English are *furniture* or *luggage*. Wiese (2012) outlines the mismatch of grammar and semantics in this group of nouns, which is potentially difficult for non–native speakers of English (Mohr 2018). While native speakers of English are aware of the morphosyntactic rules of the mass–count distinction from very early on (Soja 1992; Wisniewski et al. 1996; Imai & Mazuka 2007), non–native speakers frequently struggle with it.

*Mass and countability in Akan*

Before discussing the expression of mass and countability in Akan, it is necessary to provide a brief typological description of the language. Akan is typologically classified as an SVO language. Its sound patterns consist of nine oral and five nasalized vowels. There are 18 consonants paired on the basis of their voicing status i.e., +voiced consonants and –voiced consonants. It is a two-way tonal language, i.e. high and low (Dolphyne 1988). Syntactic categories such as tense, aspect, mood, negation, etc. are marked morphologically through affixation (Osam 2004) and prosodically via tone (see, e.g., Dolphyne 1988).

Dimmendaal (2000) observes that in comparison to Indo-European languages, African languages have not received much attention where the mass-count noun distinction is concerned. With respect to Akan, no dedicated studies have been conducted on the distinction, to the best of our knowledge. That is why we cannot elaborate on it in detail in the following and only provide a rather general overview.

Adopting Carter and McCarthy's (2007) classification, we identify Akan as a plural language, but unlike English, number is morphologically marked on nouns by both prefixation and suffixation or stem vowel changes. For instance, the words *a-hem-fo* 'chiefs' and *a-sukuu-fo* 'school children' are marked with the prefix *a-* and suffix *-fo*. According to Osam (1993), this type of double plural marking is restricted to human nouns. For this reason, non-human nouns do not undergo this process. Osam (1993: 153) argues that "[...] the current noun prefixes are the historical remains of the old noun class system that must have existed in Proto-Akan". This is somewhat similar to the Bantu noun class system. Osam (1993) shows that in Akan, the prefixes that are attached to bare nouns are semantically motivated and are thus sensitive to animacy. Singular animate nouns take *o-/ɔ-*, with some exceptions (i.e., some inanimate entities such as *ɔbotan* 'rock', *ɔman* 'country' occur with this prefix). Inanimate objects on the other hand are prefixed with *e-/ɛ-*. This is exemplified in Table 1.

Table 1: Singular noun prefixes in Akan (Osam 1993: 155)

<b>Animate Noun</b>	<b>Gloss</b>	<b>Inanimate Noun</b>	<b>Gloss</b>
<i>o-panyin</i>	‘elder’	<i>ε-boɔ</i>	‘stone’
<i>ɔ-hene</i>	‘chief’	<i>ε-dan</i>	‘building’
<i>ɔ-pɔnkɔ</i>	‘horse’	<i>ε-pono</i>	‘table’
<i>a-kokɔ</i>	‘chicken’	<i>e-tuo</i>	‘gun’

When inanimate count nouns such as those outlined in Table 1 are expressed as plurals, they take either the vowels *a-/e-* or the homorganic nasals *m-/n-* as prefixes. They are paired with the root nouns on the basis of vowel harmony (Osam 1993) (see Table 2).

Table 2: Plural noun prefixes in Akan

<b>Animate Nouns</b>	<b>Gloss</b>	<b>Inanimate Nouns</b>	<b>Gloss</b>
<i>m-panyin-fo</i>	‘elders’	<i>a-boɔ</i>	‘stones’
<i>a-hen-fo</i>	‘chiefs’	<i>a-dan</i>	‘buildings’
<i>a-pɔnkɔ</i>	‘horses’	<i>a-pono</i>	‘tables’
<i>n-kokɔ</i>	‘chickens’	<i>a-tuo</i>	‘guns’

There is a further distinction between the way plurals are formed within the animate category. Nouns semantically characterized as [+animate -human] take either the prefix *a-*, such as *ɔ-pɔnkɔ* ‘horse’ > *a-pɔnkɔ* ‘horses’ or the homorganic nasal *n-*, such as *akokɔ* ‘chicken’ > *n-kokɔ* ‘chickens’. On the contrary, [+animate +human] nouns take the prefix *a-/m-* and the suffix *-fo* simultaneously, for example *a-hen-fo* ‘chiefs’ and *m-panyin-fo* ‘elders’. It must also be mentioned that both animate and inanimate nouns in Akan can be directly combined with numerals. Osam (1993: 156) explains that Akan makes a [+human] and [-human] distinction when numeral modifiers occur with nouns. When the cardinal numerals 1–9 modify [+human] nouns, the form of the numeral is different from when they occur with [-human] nouns. The morpheme *ba-* ‘child’ is prefixed to a numeral that goes with [+human] nouns, as in examples (7) and (8). The numerals, however, remain unmodified when combined with [-human] nouns as shown in examples (9) and (10). Generally, numeral modifiers are positioned after nouns. Note that the nouns maintain their singular and plural affixes in such combinations.



7. *o-panyin baako*

*SG-elder-one*

*'one elder'*

*m-panyin-fo*

*PL.prefix-elder-PL.suffix.*

*'two elders'*

*ba-anu*

*child-two*

8. *o-hene baako*

*SG-chief one*

*'one chief'*

*a-hen-fo ba-anan*

*PL-chief-PL child-four*

*'four chiefs'*

9. *a-koko baako*

*SG-chicken one*

*'one chicken'*

*n-koko mmienu*

*PL-chicken two*

*'two chickens'*

10. *e-pono baako*

*SG-table one*

*'one table'*

*a-pono mmiensa*

*SG-table three*

*'three tables'*

The situation is the same in contexts where the nouns combine with the cardinal numerals 10 and above. That is to say that the singular and plural affixes attached to the nouns are maintained.

There are also mass nouns like *nsuo* 'water', *mogya* 'blood', *atekye* 'mud' which do not have plural forms. Nouns like *atekye* 'mud' cannot be combined with numerals. For *nsuo* 'water', it takes a numeral only when an object of measurement is present. The object of measurement is often in the form of a container. For example, to express *nsuo* 'water' in the plural form,

one would have it in the form *nsuo bokiti mmiensa* ‘three buckets of water’. In that regard, Akan is hence similar to other plural languages like English (see also Section 3.1).

### **Testing mass and countability in a quantity judgment task**

As mentioned in the introduction, the quantity judgment task as applied here was first employed by Barner and Snedeker (2005) with American native speakers of English. It has since been applied with speakers of other languages, mostly Asian (e.g., Li et al. 2008; Inagaki & Barner 2009; Erbach et al. 2021), and proven to be a robust method to investigate the semantics of the mass–count distinction in different languages. Lima (2014) adapted the experiment for her fieldwork on Yudja, a language of the Tupí language family, spoken in Brazil. Her adaptations are certainly an important reference. These previous versions of the experiment are briefly explained in the next section, followed by an outline of the experiment with the Ghanaian participants.

#### *Previous versions of the experiment*

The original experiment series by Barner and Snedeker (2005) consisted of three parts. Of these, only the second one was conducted with the Ghanaian participants, as it was basically an improvement of the first part.

In the experiment, Barner and Snedeker (2005: 49) tested the assessment of count, substance–mass and object–mass nouns, thus trying to determine whether they quantify over individuals or stuff. For this, the participants (American native speakers of English) were presented with pictures of 12 stimuli, i.e. four from each category of nouns, illustrating one large quantity and several smaller portions of the stimulus in question. The large portion had a larger combined surface area than the three small portions. The stimuli were presented in randomized order. The participants were then asked who of two fictional characters had more of the stimulus, the person with the large quantity or the one with the many small portions. Mass nouns were presented with mass syntax (e.g., “who has more ketchup?”, “who has more furniture?”), count nouns with count syntax (e.g., “who has more candles?”) (Barner & Snedeker 2005: 50). The experiment was repeated with children, to whom the stimuli were presented using toys instead of pictures. The experiment was repeated with children, to whom the stimuli were presented using toys instead of pictures. The results showed that count and object–mass nouns were assessed according to cardinality by both adults and children, i.e., the participants chose the several small portions of the stimulus over the large

quantity when asked who had more. Substance mass nouns were assessed according to volume, i.e., the larger quantity was chosen. These results were interpreted as evidence that both count and object–mass nouns denote individuated objects, while substance–mass nouns do not.

As mentioned before, the experiment was replicated with speakers of languages other than English, one of them being Japanese (Inagaki & Barner 2009). For this, only one stimulus was in fact adapted, i.e., *butter* was changed to *peanut butter* (Inagaki & Barner 2009: 119). A more thorough cultural adaptation did not seem necessary, or rather, no problems with the experiment procedure were reported. It was probably not changed any further in order to account for the study’s comparative element. Here, Japanese and American English speakers were compared (Inagaki & Barner 2009: 119).

A more interesting adaption of the experiment was conducted by Lima (2014) for her study on Yudja. Lima (2014: 120–121) replicated the quantity judgment experiment with speakers of the language, using three notional mass nouns (‘water’, ‘flour’, ‘meat’), three notional count nouns (‘bowl’, ‘chicken’, ‘spoon’) and two object–mass nouns (‘clothing’, ‘ceramic’). Most interestingly, her participants assessed all nouns based on cardinality and did not vary their judgments based on notional countability at all (Lima 2014: 128). Thus, Yudja represents a language in which all nouns are notionally count, a case that is highly uncommon cross–linguistically.

#### *The Ghanaian version of the experiment*

The experiment in Ghana was conducted with L1 speakers of Akan (Asante–Twi) and L2 speakers of English; they have partly been reported in Mohr (2018, 2022). The Ghanaian experiment is comparable to studies like Inagaki and Barner (2009), comparing it in two different languages. Sixteen (16) L2 speakers of English (henceforth “GhanaE” group) and twelve (12) L1 speakers of Akan (henceforth “GhanaA” group), all students at the University of Ghana in Accra, took part in the experiment. The first group’s mean age was 23 (SD = 1.4), and that of the second was 24 (SD = 1.1) (Mohr 2018: 172; Mohr 2022: 123). The home language of the participants of the GhanaA group was Akan, and the GhanaE group used English, Ga, Gonja or different varieties of Akan (Akuapem, Fante, Twi) at home (see also Mohr 2018: 174; Mohr 2022: 125). These did not play a role in the experiment, which was exclusively conducted in English or in Akan in each of their experiment groups in order to limit possible interferences from other languages. We are aware that, specifically in the second group, other languages might influence the results obtained here. However, completely monolingual speakers, be it of Akan and specifically English, which is not an L1 in Ghana, do not exist. Therefore, we believe that our results are

meaningful, nevertheless. It would certainly be desirable to follow up on our results in future studies.

Before the experiment, participants had to complete a brief questionnaire in order to record their demographics, such as gender and age, and also their native languages and home languages (see Mohr 2018: 167; Mohr 2022: 119). They were then informed about the procedure of the experiment. For the GhanaE group, this was done in English by the first author, and for the GhanaA group, this was executed in Akan by a research assistant who is fluent in the language. The first author was however present the whole time and observed all participants.

The stimuli were presented in random order on laminated flash cards, showing one big portion of the stimulus on the left and three small portions of it on the right. As in Barner and Snedeker's (2005: 50) original experiment, the big portion had a larger combined surface area than the three small portions. For the Akan experiment, the stimuli were presented on separate flash cards, one for the big portion of the stimulus and another for the three small portions. This was owed to the research assistant who found the experiment easier to handle in this way (see Mohr 2018: 168; Mohr 2022: 120–121). For an example of a stimulus, the reader is referred to the original website<sup>2</sup> (here *shoe/mpaboa*, showing the original picture) or Mohr (2022: 121) for *cutlery/adidide*.<sup>3</sup>

The setting was explained as “Here are two people, person 1 and person 2. Person 1 has that many/much X, person 2 has that many/much X”. In Akan, the setting was explained as “*Nnipa mmienu nie, nea odi kan ene nea ɔto so mmienu. Nea odi kan no wɔ X. Nea ɔto so mmienu no wɔ X*” (‘Here are two people. The first person and the second person. The first person has X. The second person has X.’; Mohr 2018: 167; Mohr 2022: 119). Subsequently, the participants were asked “who has more X?”. In Akan, there is more than one possibility of asking ‘more’, one implying size and another implying cardinality. The question referring to size was posed as “*wɔ mmfoni yi mu, hwan na ɔwɔ X kɛse?*” (‘In this picture, who has moresize X?’), the question referring to cardinality as “*wɔ mmfoni yi mu, hwan na ɔwɔ X bebre?*” (‘In this picture, who has more<sub>cardinality</sub> X?’; Mohr 2018: 168; Mohr 2022: 121). Two different versions of

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2 [https://www.heilpaedagogik-info.de/kinder/ausmalbilder/ausmalbild-malvorlage--Schuh--782--ausmalbilder\\_kleidung\\_34\\_.png](https://www.heilpaedagogik-info.de/kinder/ausmalbilder/ausmalbild-malvorlage--Schuh--782--ausmalbilder_kleidung_34_.png)

3 For copyright reasons, the pictures employed in the experiment cannot be printed here. However, the first author would be happy to share them with interested readers privately.

the experiment were hence run, one asking for more in size for all stimuli, and another asking for more in number. Seven (7) participants took part in the first version, five (5) in the second (Mohr 2018: 168–169; Mohr 2022: 121).

The stimuli employed were fashioned after Barner and Snedeker’s (2005) original experiment.<sup>4</sup> In English, this did not pose a problem and they were not altered in any way (see Mohr 2018: 171–179; Mohr 2022: 117–122). For the Akan experiment, the same pictures were used with a few differing terms though. An overview of them is presented in Table 3 (from Mohr 2018: 169). The Akan translations were developed by the second author and supported by other staff at the Department of Linguistics of the University of Ghana.

Table 3: Experiment stimuli in English and Akan

Count nouns		Substance-mass nouns		Object-mass nouns	
English	Akan	English	Akan	English	Akan
candle	<i>kyɛnere</i>	butter	<i>margarine</i>	clothing	<i>ntaadeɛ</i>
cup	<i>kuruwaa</i>	ketchup	<i>ntos a y’ayam ‘blended tomato’</i>	cutlery	<i>adidideɛ</i>
plate	<i>prɛte</i>	mustard	<i>borɔde fufuo ‘plantain fufu’</i>	jewelry	<i>agudeɛ</i>
shoe	<i>mpaboa</i>	toothpaste	<i>aduro a yɛ de twitwi yɛ se ‘medicine used for brushing the teeth’</i>	furniture	—

As illustrated in Table 3, one stimulus, ‘furniture’ was not used in the Akan experiment. This was due to the inability to find an Akan word that directly maps onto the English word furniture. The closest word is the conjoined form *nkongwa* ‘chairs’ *ne apono* ‘tables’ (i.e., chairs and tables, referring to the individual components of furniture).

Similarly, none of the developers of the experiment felt there was an adequate translation, even a very artificial one like *aduro a yɛ de twitwi yɛ se* for toothpaste (lit. ‘medicine we use to scrub our teeth’). This is a first issue that should be resolved in a new version of the experiment. Ideally, another subject–mass noun existing both in English and Akan, should be found. In the

4 One stimulus, ‘mail’, was left out of the analysis because no appropriate picture accounting for the heterogeneity of mail, consisting of letters, parcels etc., could be found.

object–mass noun category, *adidide* is also worth noting, as it is not a common Akan word. It is a paraphrase that was understood by all participants in combination with the flash card, though, literally meaning ‘eating thing’. This is another stimulus that is not ideal for the Ghanaian context. It is also apparent that none of the stimuli in the substance–mass noun category was translated literally. However, this does not make all of them problematic. *Borode fufuo* ‘plantain fufu’ was thus used referring to the flash card with mustard on it. While this might seem far–fetched at first, everyone involved in developing the translations as well as every single participant of the GhanaA group agreed that this term fitted the picture of the stimulus best.<sup>5</sup>

Similar to *adidide*, which is a paraphrase describing its referent, is *ntos a y’ayam* meaning literally ‘tomatoes that we have ground’. This is hence not a completely natural stimulus but acceptable, i.e., it did not cause any reaction of surprise among the participants. *Margarine*, an English loan word, was also acceptable to the Akan participants. In the development of the stimuli, it was preferred over butter. It must be mentioned that within the Ghanaian context, margarine is used as a hypernym for fatty spreads, just as the brand name “Pepsodent” stands in for all types of toothpaste. Finally, *toothpaste* posed one of the biggest problems for the Akan experiment. As mentioned above, it was translated as *aduro a yE de twitwi yE se* ‘medicine that we use to brush our teeth’, a translation that did cause many surprised reactions among the participants during the experiment. They suggested pepsodent (the most common brand of toothpaste in Ghana and an English loan word) should have been used instead. It is an eponym used for all kinds of toothpaste. Certainly, in the future it would be better to develop a completely different stimulus for which neither a paraphrase nor a loan word would have to be used.

With respect to the count noun stimuli, no difficulties were encountered. It needs to be mentioned however, that some of them, like *prEte* ‘plate’, are loan words that have been phonologically adapted to Akan.<sup>6</sup>

A brief look at the results as also reported in Mohr (2018, 2022) shows that the English stimuli could be applied without any problems in the GhanaE group. In this group, stimuli were assessed in the same way as by native English speakers (Barner & Snedeker 2005), implying that there is no considerable difference between L1 and L2 English speakers. Mohr (2022), however, shows that Tanzanian L2 speakers of English behaved different from both American L1

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5 It can be found here: <https://www.marions-kochbuch.de/index-bilder/senf.jpg>.

6 We would like to thank one of the anonymous reviewers for pointing out that loan words which have become near native should be acceptable.

and Ghanaian L2 English speakers, and more investigations into this phenomenon in African varieties of English seem necessary. In the GhanaE group, count and object–mass nouns were assessed according to cardinality, with 88.9% and 98.4% respectively (Mohr 2018: 179; Mohr 2022: 129). This shows that the object–mass nouns were assessed based on cardinality even more than the count nouns, which constitutes a difference from L1 speakers after all. Three of the object–mass nouns, *clothing*, *cutlery* and *furniture* were assessed based on cardinality by all participants (Mohr 2018: 179; Mohr 2022: 129). This implies that this construal of object–mass nouns as denoting individuals might indeed be a reason for the frequent pluralization of them among non–native speakers of English in Ghana. Substance–mass nouns altogether were assessed based on volume, although one stimulus, toothpaste, was assessed based on cardinality by the majority of the participants (56.3%: Mohr 2018: 179; Mohr 2022: 129).<sup>7</sup> It may hint at the fact that the stimuli have to be adapted culturally, even though we assume that in this particular case the evaluation might be due to the depiction of the stimulus in the picture (see Mohr 2022: 127). The volume option in the picture might evoke a certain individuatedness, similar to the cardinality option.

Altogether, in the GhanaA group, all categories of nouns were assessed based on volume (Mohr 2018: 181; Mohr 2022: 130). This seems to be due to the fact that two different versions of the experiment were run and the majority of the participants (N=7) took part in the version targeting size. Hence, all participants who took part in the “volume version” of the experiment judged all stimuli based on volume, while all participants who took part in the “cardinality version” of the experiment judged all stimuli based on cardinality. There was only one participant who completely ignored the questions and assessed all substance–mass nouns based on volume, and all count and object–mass nouns based on cardinality. These results give reason to investigate the semantics of quantifiers in Akan in more detail, for instance fashioned after Lima’s (2014) research on quantifiers in Yudja. Further, should the results of this experiment be replicated in a culturally more adequate version of the experiment, they would without a doubt be extremely interesting, regarding the conceptualization of the mass–count distinction in Akan. Based on the version of the experiment provided here, they have to be taken with a pinch of salt. The next section provides suggestions for a better adaptation of the experiment to the Ghanaian cultural context, outlining other, more successful semantic experiments in Akan.

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7 While Mohr (2018: 180; Mohr 2022: 129–130) employed statistical procedures (Cochran’s Q test) to investigate significant differences between the individual noun categories, she also mentions that they are not reliable due to the low number of participants in the experiments. We thus refrain from reporting these results here.

## **Towards a better cultural adaptation of linguistic experiments to the Ghanaian context**

In the discussion of the adaptation of linguistic experiments to different cultural contexts, the distinction between *adaptation* and *translation* is central. Translations, as has been shown by previous research (e.g., Hendrickson 2003; Van der Veer et al. 2003; Peña 2007), might ensure linguistic equivalence, but this is not sufficient to ascertain functional, metric, and importantly, cultural (conceptual) equivalence in experiment designs. This might indeed be one reason why some stimuli, such as *aduro a yɛ de twitwi yɛ se* (‘toothpaste’) were problematic in the Akan experiment outlined previously, as they are mere, and sometimes inept, translations of a culturally foreign item and concept. This is especially problematic as cultural and functional equivalence are closely related and dependent on the salience of an item or concept within a particular cultural context (Sechrest et al. 1972; Arnold & Matus 2000). “Cultural interpretations may affect the ways individuals respond to instructions and research instruments” (Peña 2007: 1258), and in other fields, item salience tests have been developed (e.g., Van der Veer et al. 2004). For linguistic experiments like the one discussed here, cultural salience is equally important and should be evaluated for the development of a new experiment design. Cultural salience is understood in this study as centrality and commonness in everyday life.

Approaches in cultural semantics account for this issue, illustrating that cultural keywords as well as other concepts are “culturally laden” and often untranslatable, but these meanings can be systematically studied and described (Goddard 2015). This has been investigated in detail for some European languages (e.g., Levisen 2012), and similar studies on African languages would certainly be desirable. An improved version of the mass-count study discussed here would, ideally, not only consist of a change in experiment stimuli but also be preceded by a closer analysis and/or discussion of the cultural meanings of the stimuli included in the experiment.

### *Cultural salience in previous experiments investigating the semantics of Akan*

Other studies have considered the issue of cultural adaptation and appropriateness for choosing their stimuli. A recent example is Agyepong (2017) in her description of cutting and breaking (C & B) events in Akan. Her focus was on the semantics of Akan verbs such as *bu* ‘break’, *twa* ‘cut’, *te* ‘tear’, etc. Given that Agyepong (2017) was also concerned with the semantics of Akan terms and provided an



outlook on cultural salience somewhat in line with cultural semantics approaches (see, e.g., Goddard 2015), the study is taken as a point of reference for the development of a new version of the quantity judgment task discussed in this study. We believe that despite the fact that Agyepong's study was not concerned with the mass–count distinction, her study can provide valuable insights. After all, the present study is mainly concerned with experiment design and methodology, and the study on the mass–count distinction in Ghanaian English and Akan was merely used as an example.

Agyepong (2017) used a set of video clips designed following an earlier version which was put together by members (Bohnenmeyer et al. 2001) of the Event Representation Project at the Max Planck Institute (MPI) for Psycholinguistics in Nijmegen. The goal of the MPI elicitation tool was to investigate the semantics and syntactic behaviour of events of cutting and breaking across languages. The videos mainly consisted of different types of objects undergoing various separation events. The separation events were carried out with different types of instruments (saw, knife, and scissors) and in varied manners. The Agyepong (2015) video elicitation tool (82 video clips), designed specifically to supplement those stimuli created by Bohnemeyer et al. (2001), was used in eliciting various types of separation verbs in Akan (Asante–Twi). The data was collected in Asante–Bekwai (Ashanti Region). The need to create a set of culture–specific video clips arose during a pilot study conducted using the sixty–one (61) video clips by Bohnemeyer et al. (2001), when it was observed that some of the objects presented, for instance, carrot, melon, teacup, and teapot were not primed by the consultants. More culturally salient objects were required as stimuli. Also, there were specific objects that elicited unique verbs. In creating the videos, the following were put into consideration (Agyepong 2017: 5):

1. The fruits, vegetables, root tubers and other food stuff were culturally familiar in the Akan contexts
2. The objects that underwent the C & B events were different
3. The actors involved in the C & B events varied to an extent
4. Different types of instruments were used in the C & B events (for example knife vs. tin cutter)<sup>8</sup>
5. The actions were carried out in different manners.

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8 The aim of this was to check if different verbs would be elicited.

Examples of some of the scenes in the Agyepong (2015) video stimuli include:



Figure 1. Separating a bunch of banana from its plant



Figure 2. Cutting the surface of a felled palm tree

Overall, the culture-specific videos were helpful in compiling a good number of verbs used in the description of separation events in Asante–Twi, i.e., verbs that could have been left out, had the researcher only used the MPI videos. For example, the palm tree in Akan has about four different types of verbs used in describing separations of individual parts (see Agyepong 2017). Examples of specific verbs elicited with the Agyepong (2015) video stimuli included, to ‘to fell a palm tree’, *dwe* ‘to separate individual palm fruit from palm bunch’, *pan* ‘to separate banana or plantain from bunch with a knife’. Additionally, consultants readily shared folk etymologies associated with some of the verbs, thus highlighting the important role of a people’s culture on language use. For example, the story about how a manner of orange peeling was named after a coin formerly used in Ghana. Note that, because the supplementary stimuli involved objects that were culturally salient to the community, participants readily shared their cultural knowledge about the subject as and when necessary.

#### *Towards a revised version of the countability experiments*

As it is apparent from the discussion of the results of the experiment on countability in section 4.2, the words *cutlery*, *furniture*, *ketchup* and *toothpaste* were especially problematic in terms of cultural salience. Paraphrases or eponymous substitutes were found for all of them except for *furniture*, which was left out altogether. However, it would be preferable to substitute these stimuli with more culturally salient concepts in a new version of the experiment.

*Butter* and *mustard* from the original experiment were less problematic as they were substituted by concepts more common in Akan culture. *Borɔde fufuo* ‘plantain fufu’ instead of *mustard* seemed a good fit and did not need to be substituted. *Margarine*, the substitute for *butter*, is salient in Ghanaian culture, but the term is a loan word and a hypernym. It could be worth considering the replacement of the term. In Table 4, we provide an overview of the original as well as the suggested new stimuli in English and Akan.

Table 4: Suggested new English and Akan stimuli for the experiment, modified stimuli underlined

Count nouns		Substance-mass nouns		Object-mass nouns	
Orig. stimulus	New stimulus	Orig. stimulus	New stimulus	Orig. stimulus	New stimulus
<i>kyɛnere</i> (‘candle’)	<i>kyɛnere</i> (‘candle’)	<i>margarine</i> (‘butter’)	<i>esam</i> (‘flour’)	<i>ntaadeɛ</i> (‘clothing’)	<i>ntaadeɛ</i> (‘clothing’)
<i>kuruwaa</i> (‘cup’)	<i>kuruwaa</i> (‘cup’)	<i>ntos a y’ayam</i> (‘ketchup’)	<i>mogya</i> (‘blood’)	<i>adidideɛ</i> (‘cutlery’)	<i>akodeɛ</i> (‘weaponry’)
<i>prɛte</i> (‘plate’)	<i>akoko</i> (‘chicken’)	<i>borɔde fufuo</i> (‘plantain fufu’ instead of ‘mustard’)	<i>borɔde fufuo</i> (‘plantain fufu’ instead of ‘mustard’)	<i>agudeɛ</i> (‘jewelry’)	<i>agudeɛ</i> (‘jewelry’)
<i>mpaboa</i> (‘shoe’)	<i>mpaboa</i> (‘shoe’)	<i>aduro a yɛ de twitwi yɛ se</i> (‘toothpaste’)	<i>mframa</i> (‘air’)	-- (‘furniture’)	<i>nwura</i> (‘rubbish’)

As illustrated in Table 4, six stimuli were substituted. The inclusion of *akoko* (‘chicken’) instead of *prɛte* (‘plate’) accounts for the fact that there were no animate stimuli in the original list of countable nouns. Given that animacy has an influence on numeral modification in Akan (see section 3.2), the inclusion of an animate stimulus was considered crucial. An anonymous reviewer pointed out that the noun ‘chicken’ is considered as flexible in English because it can refer to both the bird and the meat at the same time. It is important to mention that the case in Akan is different in the sense that the count reference, two or more birds is *akoko* ‘chicken’. The mass reference, i.e., meat occurs in the form of a compound word *akoko nam* ‘chicken meat’. *Esam* (‘flour’) substituting *margarine* was chosen in order to replace the loan word. Further, all substance-mass nouns in the original list were liquids, which might have had an impact on the results. Thus, the inclusion of a non-liquid substance seemed necessary. *Mogya* (‘blood’), *mframa* (‘air’) and *akodeɛ* (‘weaponry’) were chosen to substitute the paraphrases created to describe the original stimuli ‘ketchup’ (*ntos a y’ayam*), ‘toothpaste’ (*aduro a yɛ de twitwi yɛ se*) and

‘cutlery’ (*adidideɛ*). Finally, *nwura* (‘rubbish’) was chosen as a fourth object–mass noun, which was not included in the previous version of the experiment, given that there is no translation of ‘furniture’ in Akan. In this way, the same number of nouns from each of the three categories, i.e., count, subject–mass and object–mass nouns, is included in the experiment and all of them would work both in an English and an Akan repetition of the experiment.

While the overall guiding principle for the selection of the new stimuli suggested here was their cultural salience in Akan, comparability with English was considered, as a new version of the experiment should ideally be conducted in both Akan and English, thus enabling contrastive linguistic comparisons. In this regard, Lima’s (2014) study on Yudja and Brazilian Portuguese was consulted for inspiration.<sup>9</sup> With the stimuli suggested, contrastive comparisons would indeed be possible, allowing insights into the conceptualization of mass and countability in two widely spoken languages of Ghana.

## Conclusion and outlook

This study presented interesting results and, importantly, identified a way forward in the study of mass and countability in Ghanaian English, Akan and possibly other Ghanaian and African languages. As such, the quantity judgment task developed by Barner and Snedeker (2005) for American L1 speakers of English is an important tool for studying the mass–count distinction, and is certainly helpful for investigating it in different Ghanaian and, possibly, African languages. However, the review of the results obtained by using mostly translated stimuli as outlined in Mohr (2018, 2022) revealed that a culture–sensitive adaptation of experiment designs and specifically stimuli is indispensable. This holds true not only for speakers of Akan but also for L2 speakers of Ghanaian English as they all share the Ghanaian cultural space. Cultural salience of stimuli should hence be foregrounded in the development of new experiment designs. As outlined above, studies such as Agyepong (2017) are a highly valuable point of reference for this development, specifically for the study of semantics. The study has some limitations that were mentioned earlier. One of them is the fact that some of the participants’ home languages, for example Ga or Gonja, might have influenced the results, even if they were not used in the experiments – they might be permanently activated in the participants’ brains. A desideratum for future research would be to account for the multilingual nature of Ghanaians’ language repertoires and investigate it with regard to the mass–count distinction.

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<sup>9</sup> Thus, ‘flour’ was chosen as a new stimulus also employed by Lima (2014).

With the new stimuli presented in this study, a culturally appropriate contrastive study into mass and countability in Ghanaian English and Akan seems very much possible. The next step is to practically apply the new stimuli, and possibly investigate related linguistic items and structures, such as the conceptualization of numeral modification and quantification, given that these have shown to be rather intriguing in the experiment, as well as in the literature (cf. section 3.2). Thus, with this study we hope to have paved the way for more in-depth research into the linguistically and culturally interesting phenomenon of countability in Ghanaian languages and cultures.

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