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Investigating the concept of individuation and judgment of quantity: Evidence from count-mass distinction*

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Abstract

The present study aims to explore English as a Foreign Language (hereafter EFL) instructors' recognition of count-mass distinction regarding the concept of individuation and judgment of quantity. Accordingly, fifteen EFL instructors recruited from different public universities in Turkey were asked to write the plural forms of a sum of fifty count and mass nouns given in a list. Participants, then, were asked to rate the elements of aggregates (either count or mass) in order to identify their semantic mappings. Following these, the participants were also given a self-rating form to check post-experiment familiarity of those fifty nouns in a random order, and they rated how familiar they were with the items given on a basis of very familiar', 'somewhat familiar' and 'not familiar'. Descriptive statistics were applied as a part of quantitative data analysis. Demographic information was given on gender and year(s) of teaching experience. As a result, it was reported that EFL instructors conceptualized count nouns as distinct individuals whereas mass nouns were regarded as non-individuals. Familiarity had a probable positive linear effect on success, though. To mention, participants did better at aggregate terms for count nouns than those of mass nouns. Besides, aggregate terms for count nouns were judged to be more familiar than those of mass nouns. The principle of cognitive individuation was confirmed with no external interference of gender and years of teaching experience.

Keywords: Count nouns; mass nouns; count-mass distinction; cognitive individuation; quantity judgment; EFL.

1. Introduction

Basically, count nouns refer to objects (*table*) whereas mass nouns refers to substances (*milk*). The distinction is made according to the morpho-syntactic properties of the nouns. Therefore, mass nouns do not take plural forms (*milks*), and some determiners cannot be used in the singular form of the mass nouns (*a milk; each milk*) except some special circumstances. On the other hand, count nouns do take the plural forms (*tables*) together with the quasi-cardinal quantifiers and determiners (*a table; these*

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tables; each table). Besides, mass nouns do not denote types of individuals albeit mass syntax does so (Barner & Snedeker, 2005; Chierchia, 1998; Gillon, 1999).

The linguistic properties beneath the count-mass distinction have long been a debate of discussion both by linguists (Allan, 1980; Bale & Barner, 2009; De Belder, 2011; Gillon, 1992; Jackendoff, 1991), and philosophers (Pelletier, 1975, 2012; Quine, 1960). Previously, the distinction between English mass and count nouns was analyzed within lexical rules (Leech, 1981) and related lexical inference rules (Ostler & Atkins, 1991). Previously, it was ascertained that human cognition was affected by language and culture (Whorf, 1956). Mass terms have also been analyzed by means of a model-theoretic semantics (Bunt, 1985) purporting the idea that the Ensemble Theory provides a conceptual framework for the analysis of natural language meaning. Notably, the concept of count-mass distinction in many of the world languages has been explained by the relationship between syntax and semantics as the acquisition of one might facilitate that of the other (Barner & Snedeker, 2005; Barner, Inagaki, & Li, 2009).

Accordingly, this study aims to explore the count-mass distinction in terms of conceptual semantics, syntactic features encoded in the brain and cognitive individuation hypothesis. In this vein, count-mass distinction as a multidimensional phenomenon together with grammatical, ontological, (conceptual-) semantic and contextual views is elaborated below before delving into the details of the current study.

1.1. The Count-Mass Distinction

The count-mass distinction has long been examined, and left a paradox whether they have little or much in common (Middleton, Wisniewski, Trindel, & Imai, 2004). For instance, though they seem different in structure, both count and mass nouns refer to super-ordinates (*animal; furniture*) and aggregates (*lentils; rice*). Abstract nouns are both for count (*idea*) and mass nouns (*evidence*). More importantly, the same or similar things are referred by both count and mass nouns (*clothing vs. garments*) albeit different in count-mass syntax (Gleason, 1969; Markman, 1985; Ware, 1979). Therefore, it is rather challenging to develop a comprehensive understanding of the count-mass distinction although there is a myriad of criteria proposed but rejected.

To mention, some researchers have suggested that the count-mass distinction ground upon the basic relationship between objects and substances (Cheng, 1973). However, count-mass syntax refers to more than objects and substances, and that is why many nouns can be used though they do not refer to merely objects and substances. Furthermore, it is argued that count nouns do have characteristics to consider; yet, mass nouns do coalesce if put together (Macnamara, 1982). Nevertheless, entities such as clouds are accepted as count nouns though they have no characteristic shape. In the same vein, crowd as a count noun refer to a coalescence, though. One more to note, it is suggested that mass nouns are the offspring of a cumulative entity; thus, when you take some from X, you again have X (Quine, 1989). But some superordinate mass nouns do not confirm this as you take a shoelace from a shoe, you no longer have a foot wear. For this reason, it is stipulated that there is actually no very ‘obvious logical reason’ in naming count and mass nouns (Quirk, Greenbaum, Leech, & Startvik, 1972).

However, more recently, the theoretical basis beneath count-mass distinction has been explained by the cognitive individuation hypothesis (e.g. Bloom, 1990; Imai, 1999; Langacker, 1987; Wierzbicka, 1988; Wisniewski, Lamb, & Middleton, 2003), by which it is purported that a person uses the term count noun if s/he perceives the referent as an individual. If the referent is perceived as a non-individuated entity, then it is accepted as a mass noun. However, age is an effective factor in labelling individuated and non-individuated entities. The semantics of this distinction in young and adults vary

as the semantic mapping and morpho-syntactic cognitive referential evidences differ in quantity judgments and individuation (Barner & Snedeker, 2005; Zanini, Benavides-Varela, Lorusso, & Franzon, 2017).

In the light of these, as an offspring of a model that reconciles different points, four fundamental theoretical viewpoints together with the cognitive individuation hypothesis blossom to explain count-mass distinction: grammatical, ontological, (conceptual-)semantics and contextual viewpoints.

1.2. The Grammatical Viewpoint

The count-mass distinction has a clear-cut grammatical basic rule composed of the (im)possibility of the plural -s morpheme (*dogs; waters*). This rule is accepted as the most evident form of the grammatical view. Therefore, in grammatical view, there is a clear-cut definition regarding the pluralization of the nouns that mass nouns do not take a plural morpheme. In the same vein, mass nouns cannot be combined with cardinal numbers, albeit take quantifiers such as much, a lot of, etc. Besides, mass nouns occur with a zero determiner in most of the contexts. According to the grammatical viewpoint, the count-mass distinction is merely grammatical, and has no interior relation with any kind of semantic variation (Bloomfield, 1933).

The grammatical viewpoint has its own objections, though. Herein, it is stated that the uncountability of the mass nouns just like the countability of the count nouns cannot be completely coincidental. Thus, the general tendency to mark count and mass nouns in terms of objects and substances is unfair without any meaning-related factors. However, the count and mass nouns cannot be fully predictable from their meanings, as well. A degree of grammatical arbitrariness is searched. For instance, despite its plural ending, the word oats is actually not a count noun, albeit does not have a singular equivalence (*oat*), and is not headed by a cardinal number (*three oats*).

1.3. The Ontological Viewpoint

In the ontological viewpoint, this distinction is regarded as a one processing between real-word entities. Mass nouns are defined by Quine (1960) as the "nouns referring to real-word entities that have the property of cumulative reference" (p. 91). In this sense, as it is unbounded, water is a mass noun. If you add water to water, one still has water, albeit nothing different. Although the quantity changes, quality remains the same. However, Cheng (1973) states that mass nouns are conceptualized distributively, albeit not cumulatively. In this context, mass nouns are characterized with the property of 'homogeneous reference' (Ter Meulen, 1981). Hence, water has a kind of structure composed of parts of water which are all alike whereas a car has a heterogeneous reference as the sub-parts of a car are not alike, and not all named a car.

The ontological viewpoint has some objections, though. For instance, it is argued that it is impossible to divide a substance into a bunch of smaller parts; therefore, it is questioned whether a very single molecule of H_2O is yet water. Yet, Martin (1989) asserts that "the count-mass distinction is much like a vision that language imposes on reality, but, at the same time, it may involve a reorganization of the world which is highly independent from reality" (p. 40).

1.4. The (Conceptual-) Semantic Viewpoint

The very basic tenet of the conceptual-semantic viewpoint is on the status it holds. According to the conceptual-semantic viewpoint, the grammatical difference between count and mass nouns is not merely connected to the external world. In other words, the count-mass distinction leans upon the meanings of the nouns, albeit not in the things they primarily name. Therefore, the distinction is made

according to conceptualization, where countability signifies individuation (e.g. *car*) and uncountability signifies non-individualization (*water*).

However, there are some examples where counthood refers to individuated conceptualization or real-word substances (e.g. *three beers, French wines*). Therefore, conceptual-semantic view is not a perfect mirror of nature of languages but able to explain how one entity can be explained by a count and mass noun by means of a difference in their forms of conceptualization.

1.5. The Contextual Viewpoint

In 1970s, the contextual view supposes that any noun can be used both as count and mass with the postulate of a fictitious machine named 'universal grinder' (Pelletier, 1979). That is to say, even a very ordinary count noun can be used in a mass format (*Buy more car for less money*.) Thus, it is stipulated that the concept of countability is not a feature of nouns as lexical entities albeit of noun phrases indeed (Allan, 1980). Accordingly, this distinction is determined by the quantifiers together with the proper determiners of the nouns (Ware, 1979). The count nouns are preceded by *a, one, two, a few, several* and *many* whereas mass nouns do take *zero determiners, a little, much, bit of* and the like.

However, the contextual viewpoint puts all in the same box by ignoring the degree of lexicalization; therefore, it falls short of explaining why most nouns apparently seem to favor one form of context over another. As an example, *car* mostly occurs in count forms whereas *wine* mostly occurs in mass forms. Hence, adhering strictly to the contextual view may neglect such a difference amidst count and mass nouns.

1.6. The Cognitive Individuation Hypothesis (CIH)

CIH perceives individuation as the principal facet of cognition and perception (Middleton et al., 2004). The central issue addressed by CIH is that counting reckons for categorization, which then paves the way to individuation. It is also suggested that even child's language acquisition is based upon individuation (Markman, 1990).

Wierzbicka (1988) introduces individuation with two canals in her analysis of count and mass syntax. Firstly, she presupposes that the differences in the interactions define whether the entities are individuated or non-individuated. Giving the example of Polish people, she argues that berry-like fruits (*raspberry, strawberry*) are labelled as count nouns since Polish people do merge with them one by one while eating or picking them whereas Polish farmers name them by mass nouns as they sell them by quantities and/or masses. Secondarily, she suggests that the facility of distinguishing also influences the concept of individuation. For instance, *beans* is a count noun whereas *rice* is a mass noun as it is much easier to distinguish beans rather than doing it with the individual grains of rice. Therefore, beans have an individuated entity; yet, rice has a non-individuated one. However, Wierzbicka's principles are also criticized on condition that they stand speculative without any empirical evidences. Besides, it is a question whether she has chosen the entities which confront with her argument. Therefore, exploring the usability of the aggregates may help to understand the conceptual understanding beneath the hypothesis since the aggregates can be operationalized for both count and mass entities (Markman, 1985; Palmer, 1981).

Above, grammatical, ontological, (conceptual-) semantics, contextual viewpoints together with the CIH are mentioned to explain the count-mass distinction as a multidimensional phenomenon. Accordingly, counthood vs. masshood, lexicalization, conceptualization vs. reality, individuated vs. non-individuated entities and motivation of the deviation have mushroomed as the basic tenets of this distinction. In the light of these, the present study is primarily concerned with the count-mass distinction, empirically evaluates the validity of the cognitive individuation hypothesis through the

prediction of the count and mass aggregates. Accordingly, the success rate of the participants on count-mass distinction was estimated. The role of aggregates in naming count and mass nouns were checked. Besides, the post-experiment familiarity check was also done to see the role of familiarity in the depiction of participants' conceptualization of the count and mass nouns. The results were elaborated in the related section under relevant sub-headings.

2. Method

In this section, participant enrolled in the study, instruments used to gather relevant data, data collection and analysis together with the procedures applied are elaborated in detail.

2.1. Participants

Fifteen EFL instructors working at different universities in Turkey were recruited at a public university in Turkey, where all of the participants were doing their Ph.Ds. Out of fifteen instructors, nine of them were female (P= 60%), and the rest were male participants (P= 40%). With regard to the years of teaching experience, the participants had the experience ranging from one to seven years, which were listed as 0-1 years (N= 3; P= 20%), 2-4 years (N= 8; P= 53.3%) and 5-7 years (N= 4; P= 26.7%) respectively. For course credit, they were voluntarily involved to complete the tasks. The participants were also wised that the results of the tasks they took were not announced separately, albeit used solely for scientific purposes.

2.2. Instrument(s)

As the first instrument, the participants were given a list of count and mass nouns in a random order, which was composed of 50 items. The items were chosen regarding the frequency in course- and text-books, and lined from simple concrete ones to more complex abstract ones. Amidst them, 5 items were accepted as more challenging ones, which were added in order to see the semantic mapping of the participants. The face validity was ensured by two experts in the field of English Language Teaching together with one from the field of Educational Statistics. The main purpose to use a test to spot the success rate was to determine participants' level of proficiency in making count and mass nouns plural. If they were found successful, then they could continue with the second stage. However, if not, they were expected to be given further training and/or remedial teaching before stepping into the second stage. In essence, as all of the participants were instructors of English with a ranging years of teaching experience, they were assumed to get eligible results from this test.

As the second instrument, the participants were given a list of aggregates which was generated by two experts from the field of Linguistics together with a research assistant at the department of English Language Teaching. For this process, they were suggested to exploit the 'Longman Lexicon of Contemporary English' (McArthur, 1981) as a guide since this lexicon was composed of a wide range of daily life, everyday nature and pragmatic topics. Pre-experiment manipulation was checked, and after the removal of the duplicates, the final list of aggregates was constituted by 50 aggregates, which was actually parallel to the number of count-mass items given previously as a list. Amidst 50 aggregates, 35 of them were count whereas 15 of them were mass nouns. This was because "concrete nouns were mainly count" (Quirk et al., 1972, p. 129).

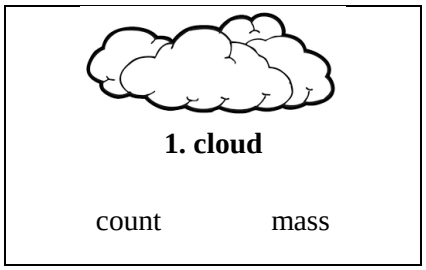
Assuming that familiarity might have an effective role in defining count and mass aggregates, post-experiment familiarity was checked by participants' self-rating to the 50 given stimuli. Accordingly, the participants rated themselves by choosing one from very familiar', 'somewhat familiar' or 'not familiar'.. Therefore, a list of count and mass aggregates given before in pictures were given as a list

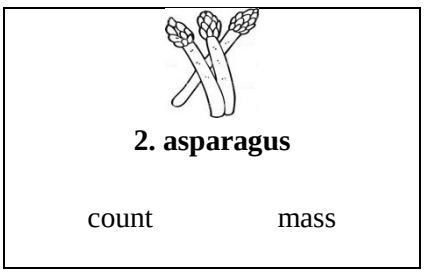
to the participants in a random order. This task was pursued to check the effect of participants' interaction with the given stimuli in order to authorize them with an individualized or a non-individualized entity.

2.3. Data Collection and Analysis

Participants were given instruction on what to do with the required tasks before the start off. First of all, the participants were expected to fill in the form in which a number of 23 count and 27 mass nouns (50 in total) were listed. The items were *pen, furniture, car, rice, table, money, book, trash-bin, wood, bike, floor, clutter, homework, blood-vessel, software, trash, pasta, food, water, equipment, blood, institute, couch, traffic, work, vegetable, department, explosion, damage, address, advice, suggestion, election, hospitality, problem, information, idea, time, minute, behavior, pride, progress, scheme, intelligence, freedom, remark, depression, issue, redemption* and *procrastination,* which were all given in a random order from simple concrete ones to complex abstract ones. The participants, herein, were directed to write the plural forms of the nouns listed randomly. All the participants took the test in person, and none of them had the chance to see the items listed before. The participants were given 15 minutes to complete the form. The results were analyzed through descriptive statistics. The Cronbach Alpha level for this test was found be highly reliable (r= .88; r> .70). For this test, it was also checked whether there was any statistically significant difference in terms of gender and years of teaching experience in the success rates of the participants. Therefore, independent samples t-test for gender, and one-way analysis of variance (ANOVA) for years of teaching experience were implemented. Herein, Statistical Package for Social Sciences (SPSS) Version 21.0 was implemented.

Secondarily, the participants were asked to determine what kind of entity the word denoted through the use of aggregates given in pictures. Each participant completed the task on his/her own. Aggregate terms used in this study was composed of 35 count and 15 mass nouns. To elaborate the terms used as the aggregates, the count nouns were *ant, bath salt, bean, bubble, cherry, chocolate chip, cigarette, cloud, clove, cookie, crayon, egg, freckle, grape, ice cube, leaf, marble, noodle, oat, olive, peanut, pebble, pin, playing card, potato chip, raisin, raspberry, rock, screw, stamp, star, sticker, tear, toothpick,* and *wrinkle.* On the other hand, the mass terms are *asparagus, cereal, confetti, dandruff, dust, grass, hair, popcorn, rain, rice, sand, snow, soil, spice* and *sugar*. For the selection of the aggregate terms, the main consideration was familiarity. Therefore, wide range of daily life, everyday nature and pragmatic topics were taken into account for the selection of the aggregate terms as count and mass nouns. No plural forms were used for the count aggregates so as not to give clues for the selection of count or mass nouns. Besides, the participants were not informed about the number of nouns but expected to circle either as count or mass.





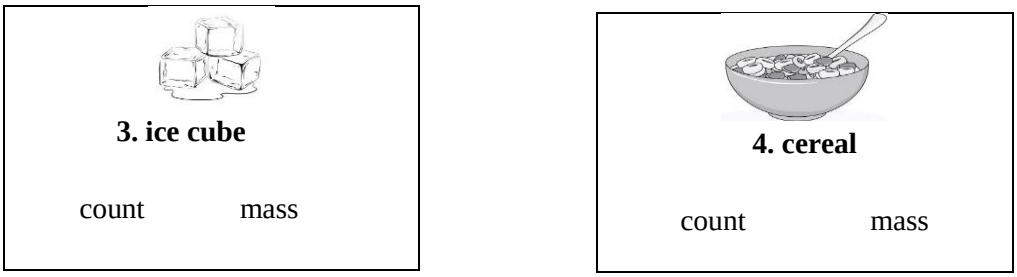


Fig. 1. Examples of four aggregates given in pictures as either count or mass nouns

Fairly, both of the tasks aforementioned were paper-and-pencil tasks. For data analysis, descriptive statistics was applied.

Besides, assuming that familiarity might have an effective role in pointing count and mass aggregates, post-experiment familiarity was checked by participants' self-rating to the 50 given stimuli. Accordingly, the participants rated themselves by circling 'very familiar', 'somewhat familiar' and 'not familiar'. Therefore, a list of count and mass aggregates in a random order were given as a list to the participants. Correlatively, participants were also instructed to rate how easy or hard to distinguish the individual units of the aggregates. The rating was varied from 1 to 9. If it was completely easy to distinguish the individual units of the aggregates, then the participants were expected to rate 1. However, if it was extremely hard to distinguish the individual units of the aggregates, then the participants were expected to rate 9. This task was pursued to check the effect of participants' interaction with the given stimuli in order to authorize them with an individualized or a non-individualized entity. The rating scheme was as given below:

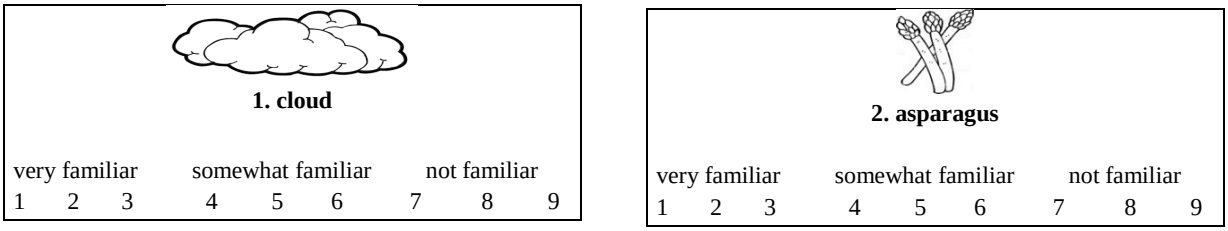


Fig. 2. Examples of two aggregates given in the rating scheme of post-experiment familiarity

For this task, the participants were given 15 minutes. The data were analyzed through frequency analysis, and percentages were estimated through the use of descriptive statistics.

3. Results

The results of this study are elaborated below, and discussed under three sub-headings: the success rates for count mass distinction, the categorization of aggregate terms either as count or mass nouns, and the post-experiment familiarity check.

3.1. The Success Rates for Count-Mass Distinction

The participants' scores were gathered from the open-ended form in which count and mass nouns were listed in a sum of 50. Herein, the participants were expected to write the plural forms of each

noun, either count or mass. Accordingly, the mean score was estimated as 40.13 (SD= 3.60) out of 50. The minimum score was 34 whereas the maximum score was 47. For items numbered 1 (*pen*), 2 (*furniture*), 3 (*car*), 4 (*rice*), 5 (*table*), 6 (*money*), 7 (*book*), 10 (*bike*), 11 (*floor*), 19 (*water*), 20 (*equipment*), 21 (*blood*), 27 (*department*), 30 (*address*), 33 (*election*), 34 (*hospitality*), 35 (*problem*), 36 (*information*), 37 (*idea*), 38 (*time*), 41 (*pride*), 44 (*intelligence*), 45 (*freedom*), and 47 (*depression*), the success rate was 100%. Therefore, all of the participants answered 24 items correctly, and did appropriately pluralize them. Amidst them, 11 items were count nouns whereas the rest (N= 13) were mass nouns. In this vein, it could be inferred that participants did good at the test as they had a background knowledge on count and mass nouns.

The success rate was also calculated for count and mass nouns separately. Herein, it was reported that the overall success rate was estimated as 84% for count nouns whereas that of mass nouns was 78%. Among the count nouns listed, the item numbered 8 (*trash-bin*) had the lowest success rate (P= 40%) as 9 participants did wrong. It was pursued by the items numbered 14 (*blood-vessel*) and 43 (*scheme*) with the success rate of 53.3%. With regard to the success rate for mass nouns, it was noted that the item numbered 12 (*clutter*) had the lowest success rate (P= 20%) as 12 participants did it wrong. It was followed by the items numbered 50 (*procrastination*), 16 (*trash*) and 21 (*blood*) with the success rates of 33.3%, 40% and 40% respectively.

Additionally, it was scrutinized whether there was any significant difference regarding gender and years of teaching experience regarding the participants' success rates for count-mass distinction. For gender, the results of the independent samples t-test yielded that there was no significant difference; $t(13)= -.994$, $p= .34$ ($p> .05$). Yet, female participants (M= 41) did slightly better than male participants (M= 39). This could be attributed to the fact that the number of female participants (N= 9) were slightly higher than that of male participants (N= 6), which might have an effect on the total mean scores. Similarly, for years of teaching experience, the results of the ANOVA yielded that there was no significant difference; $F(2, 12)= 2.289$, $p= .144$ ($p> .05$); thus, it might be speculated that years of teaching experience, which was actually ranging from 0 to 7 years, had no significant effect on success rates of the participants.

3.2. The Categorization of Aggregate Terms: Count or Mass?

The participants were asked to determine what kind of entity the word denoted through the use of aggregates given in pictures, which were composed of 35 count and 15 mass nouns. Herein, the main purpose was to see whether the participants had an understanding of count and mass forms of nouns since the - status of an aggregate could be inferred from the perceptibility of its components. Although plural forms were needed for the aggregate terms of count nouns, singular forms were used so as not to give clues on countability and/or non-countability.

The results yielded that mean score regarding the participants' classification of aggregate terms either as count or mass noun was estimated as 38 (SD= 3.95) with a minimum score of 33 and maximum score of 45 out of 50. To elaborate, the participants did better at aggregate terms for count nouns (P= 82%) than those of mass nouns (P= 68%). The highest ratio for count noun aggregates (P= 100%) was estimated at the items numbered 1 (*ant*), 5 (*cherry*), 6 (*chocolate chip*), 10 (*cookie*), 12 (*egg*), 13 (*freckle*), 14 (*grape*), 16 (*leaf*), 17 (*marble*), 20 (*olive*), 21 (*peanut*), 23 (*pin*), 24 (*playing card*), 25 (*potato chip*), 27 (*raspberry*), 30 (*stamp*), 31 (*star*), and 32 (*sticker*). For mass noun aggregates, the highest ratio (P= 100%) was estimated at the items numbered 37 (*cereal*), 42 (*hair*), 44 (*rain*), 45 (*rice*), and 50 (*sugar*). On the other hand, the lowest ratio for count noun aggregates was estimated at the item numbered 19 (*oat*), 8 (*cloud*), 15 (*ice cube*), 18 (*noodle*), and 26 (*raisin*) with the percentages of 20, 40, 40, 40 and 40 respectively. For mass noun aggregates, the lowest ratio was

calculated at the item numbered 49 (*spice*), 36 (*asparagus*), 38 (*confetti*), 39 (*dandruff*), and 43 (*popcorn*) with the percentages of 26.7, 33.3, 40, 40 and 46.7 respectively.

3.3. The Post-Experiment Familiarity Check

Assuming that familiarity of count and mass aggregates might interfere in the success rates, the participants' post-experiment familiarity was checked. To check post-experiment familiarity, the participants were given a list of count and mass aggregates (N= 50) in a random order by pictures, on which they were expected to rate themselves by circling 'very familiar', 'somewhat familiar' and 'not familiar'. Herein, the rating was varied from 1 to 9. If it was completely easy to distinguish the individual units of the aggregates, then the participants were expected to rate 1. However, if it was extremely hard to distinguish the individual units of the aggregates, then the participants were expected to rate 9. This task was pursued to check the effect of participants' interaction with the given stimuli in order to authorize them with an individualized or a non-individualized entity.

Accordingly, on average, an aggregate was found 'very familiar' with the ratio of 80.11%, 'somewhat familiar' with the ratio of 3.48%, and 'not familiar' with the ratio of 16.41%. Therefore, it could be stipulated that the greater part of participants circled either 'very familiar' or 'somewhat familiar' (P_{tot}= 83.59%). Importantly, aggregate terms for count nouns were judged to be 'very familiar' (P= 84%) and 'somewhat familiar' (P= 4%) at the percentage of 88 whereas those of mass nouns were judged to be 'very familiar' (P= 73%) and 'somewhat familiar' (P= 5%) at the percentage of 78. Besides, aggregate terms for count nouns were found to be 'not familiar' at the ratio of 12% whereas those of mass nouns were found to be 'not familiar' at the ratio of 22%.

In the section under the heading of 'categorization of aggregate terms as either count or mass', some items with their numbers and estimated ratios were previously given. With special reference to those listed underneath, the highest ratio for count noun aggregates (P= 100%) was noted to be estimated at the items numbered 1 (*ant*), 5 (*cherry*), 6 (*chocolate chip*), 10 (*cookie*), 12 (*egg*), 13 (*freckle*), 14 (*grape*), 16 (*leaf*), 17 (*marble*), 20 (*olive*), 21 (*peanut*), 23 (*pin*), 24 (*playing card*), 25 (*potato chip*), 27 (*raspberry*), 30 (*stamp*), 31 (*star*), and 32 (*sticker*). For mass noun aggregates, the highest ratio (P= 100%) was marked to be estimated at the items numbered 37 (*cereal*), 42 (*hair*), 44 (*rain*), 45 (*rice*), and 50 (*sugar*). Taking these into account, aggregate terms for count nouns were found to be 'very familiar' and 'somewhat familiar' at the ratio of 90% whereas those of mass nouns treated to be 'very familiar' and 'somewhat familiar' at the ratio of 88%. On the other hand, the lowest ratio for count noun aggregates was pointed out to be estimated at the item numbered 19 (*oat*), 8 (*cloud*), 15 (*ice cube*), 18 (*noodle*), and 26 (*raisin*) respectively. For mass noun aggregates, the lowest ratio was noted to be calculated at the item numbered 49 (*spice*), 36 (*asparagus*), 38 (*confetti*), 39 (*dandruff*), and 43 (*popcorn*) respectively. In this context, post-experiment familiarity for count noun aggregates was found to be 'not familiar' with the ratio of 63% whereas that of mass noun aggregates was ascertained to be 'not familiar' with the ratio of 80%.

4. Discussion

The results of the present study yielded that participants had a background knowledge of count-mass distinction, and properly pluralized the items given randomly. This facilitated the process as there was no need for further training and/or remedial teaching, albeit a search for the conceptual framework beneath this distinction. While making plural, the participants are noted to label a stimuli as count if they happen to give an individuated entity to it; nevertheless, they tend to label a stimuli as mass it they happen to give an non-individuated entity to it, which actually supports the cognitive

individuation hypothesis. Participants' general knowledge on count-mass distinction supports the idea that they have interacted the count-mass syntax together with the individuated and non-individuated entities.

Similar studies have also showed that people have some general knowledge on such issues (Bloom & Kelemen, 1995; Soja, 1992); yet, knowledge on the concept of individuation may perhaps be disguised (Ware, 1979). Noteworthy, gender and years of teaching experience have no significant effect on the success rates of the participants. However, it is to be taken into consideration that the semantics of this distinction in young and adults vary as the semantic mapping and morpho-syntactic cognitive referential evidences differ in quantity judgments and individuation (Barner & Snedeker, 2005; Zanini et al., 2017). Thus, it is recommended for further studies to involve both children and adults in comparison.

In this sense, aggregate terms for count and mass nouns have been consulted to show evidence for the concept of individuation. Regarding the aggregates, it is noted that participants distinguished the elements of given aggregate terms for count ones better than those of mass ones. This might be due to the fact that they have conceptualized the aggregate terms for mass nouns mostly as minimal units (Middleton et al., 2004). It, therefore, shows that the concept of individuation is affected by the count-mass status. Yet, the mass nouns can be of a more general class when the issue is pluralization (Corbett, 2000) whereas the same case for count nouns refers to multiplying things of the same kind (Bloom & Kelemen, 1995).

The participants are not given plural forms or any kind of identifiers when they are asked to circle the appropriate term for count and mass aggregates. This is due to the fact that when nouns are not accompanied with a classifier or a plural marker, they seem like collectives in the semantic mapping with an avoidance of a direct number construction (Greenberg, 1972). Besides, participants quantity judgments are influenced by their perceptions of the presence of individuals while employing their syntactic information. It might be attributed to the simple interaction between semantics and syntax (Imai & Gentner, 1997). However, individuation is a broader concept which both lexical and syntactic representations interplay within. To mention, lexical semantics also communicates with count-mass syntax to remark the concept of individuation (Barner et al., 2008).

Moreover, the concept of individuation for aggregates is bounded to the variation of predication (Wisniewski et al., 2003). Therefore, post-experiment familiarity is checked to pinpoint how familiarity affects participants' conceptualization of individuated and non-individuated entities. In this context, aggregate terms for count nouns are found to be 'not familiar' at the ratio of 12% whereas those of mass nouns are found to be 'not familiar' at the ratio of 22%. This might be due to the fact that people have often had an interaction with the multiple elements of aggregates of mass nouns at a time (Wierzbicka, 1988). This feature also signifies the relationship between count-mass syntax of super-ordinates and conceptualization (Wisniewski, Imai, & Casey,1996). For instance, *furniture* is a super-ordinate category of *table*, *chair*, *lamp*, and etc. Although *furniture* is a mass noun, the followings are count nouns. Thus, the conceptualization of such terms becomes even harder as these count nouns represent distinct entities, albeit are also considered a mass noun (*furniture*).

Additionally, participants give lower ratings to the aggregate terms for count counts than those for mass nouns in the post-experiment familiarity check. Herein, there seems to be a negative linear relationship between ratings and distinguishability. If the rating is lower, then the it becomes easier to distinguish the elements of an aggregate. In the light of these, it is stipulated that it is much easier for participants to identify the individual units of the aggregate terms for count nouns. However, it is rather harder for participants to distinguish the individual units of the aggregate terms for mass nouns. This situation actually confirms the Wierzbicka's hypothesis (Wierzbicka, 1988) as count nouns are

more constituted by more perceptible elements than mass nouns since the status of an aggregate (either count or mass) is fed upon the perceptibility of its elements. Being consistent with the previous literature (e.g. Landau, Smith, & Jones, 1988; 1992), current study also supports perceptual (or shape) bias in the categorization of count and mass nouns as there is a crystal-clear effect of frequency. However, except for some, count nouns do not generally refer to shapes, or things that are explained through their shapes (Soja, Carey, & Spelke, 1991) since the topic of discussion is fairly the nature of individuals.

In sum, current study supports the cognitive individuation hypothesis, even paves the way towards a more comprehensible study to give clues for 'number asymmetry hypothesis' (Barner & Snedeker, 2006) as the count syntax reflects individuation whereas mass syntax implies non-individuation. Besides, as a limitation for this study, sample size seems small for the generalizability of the results although directions given to the participants are followed properly, and the instruments are valid and reliable. The participants are also noted to be at high level of proficiency in English, and are recruited by 'convenience sampling' (Dörnyei, 2007; Nunan, 1992) due to the accessibility by the researcher. Thereto, participants' L1 semantic mapping and conceptual structure of L1 might have an effect on the conceptualization of count-mass distinction in L2. Such kind of an effect might be a topic of research; therefore, it is recommended to probe into a comparative study between Turkish-English.

5. Conclusions

So far, the present study has empirically probed into the validity of the cognitive individuation hypothesis through the use of count-mass aggregates. Specifically, the success rate of the participants is checked through a test in which count and mass nouns are listed randomly, and they are expected to fill in the gaps with the appropriate plural forms if required. Following that, aggregate terms for count and mass nouns are given in a random order. Herein, the participants are expected to choose the proper form, either count or mass, for the aggregates given in pictures. It is backed up by the post-experiment familiarity check form to spot the perceptual distinguishability of the aggregates given. Hereby, the participants are expected to circle the degree of familiarity to given count and mass aggregates.

As a result, it is reported that aggregates for count nouns are more familiar for participants than those of mass nouns. Count nouns symbolize individuation whereas mass nouns do not. Therefore, it blossoms as a fact that mass nouns do mostly refer to null context, which makes them uncountable in essence (Sutton & Filip, 2016). Besides, it is precipitated that there is an obvious effect of participants' interaction with the given stimuli in authorizing count and mass nouns with an entity of individualized or non-individualized. The principles of cognitive individuation is confirmed with no external interference of gender and years of teaching experience. It is evidential that there are some universal properties beneath count-mass distinction; yet, it is expected that the present study can therefore give potential base and robust account for further research on cognitive individuation hypothesis just as the studies heretofore conducted in order to develop a better understanding for this distinction.

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Bireyleşme ilkesi ve ölçü yargısı üzerine bir inceleme: Sayılabilen isimler ve kütle isimleri ile sunulan kanıt

Öz

Bu çalışma, İngilizce okutmanlarının sayılabilen isimler ile kütle isimleri arasındaki ayrımı bireyleşme ilkesi ve ölçü yargısı kapsamında nasıl açıkladıklarını incelemek üzerine yapılmıştır. Bu bağlamda, Türkiye'nin farklı üniversitelerinde çalışan 15 İngilizce okutmanından, öncelikle sayılabilen ve kütle isimlerinden oluşan karışık sıradaki 50 kelimenin çoğulunu yazmaları istenmiştir. Burada amaç, katılımcıların sayılabilen ve kütle isimleri hakkındaki önbilgisini değerlendirmek ve başarı durumunu saptamaktır. Beraberinde, katılımcılara küme şeklinde resimler eşliğinde verilen, yine karışık sıradaki kelimelerden hangilerinin sayılabilen, hangilerinin ise kütle ismi olduğunu işaretlemeleri istenmiştir. Burada istenen, katılımcıların anlambilimsel haritalarından yararlanmaktır. Son olarak, katılımcılara aynı kelimeler yine resimler eşliğinde verilmiş, araştırma sonrası kontrol etme yoluyla bu kelimelere olan aşinalık derecelerini belirtmeleri istenmiştir. Bunu yaparken, katılımcılardan istenen 'çok aşina', 'bir miktar aşina' ve 'hiç aşina değil' şıklarından birini daire içine almaktır. Burada istenen ise kelimelerin sayılabilirliğini belirlemede aşinalığın etkisini saptamaktır. Elde edilen nicel veriler, betimsel istatistik kullanılarak analiz edilmiştir. Demografik bilgi olarak, katılımcıların cinsiyet ve öğretme deneyimleri not edilmiştir. Sonuç olarak, katılımcıların sayılabilen isimleri bireyleşme algısı ile bağdaştırdığı, kütle isimlerinde ise bireyleşme algısından uzaklaştığı gözlemlenmiştir. Ayrıca, bu araştırmanın sonucu göstermiştir ki katılımcılar sayılabilen isimlere, kütle isimlerinden daha aşinadır. Kelimelerin sayılabilen veya kütle ismi olarak belirlenmesindeki başarı düzeyinde aşinalığın olumlu doğrusal etkisi olduğu saptanmıştır. Bireyleşme ilkesi, cinsiyet ve öğretme deneyiminin etkisinden bağımsız olarak doğrulanmıştır.

Anahtar sözcükler: sayılabilen isimler; kütle isimleri; bireyleşme ilkesi; ölçü yargısı; İngilizce.

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