GRAMMATICAL AND LEXICAL DEVELOPMENT IN MODERN GREEK EXPOSITORY AND NARRATIVE TEXTS: A FOCUS ON NOUN PHRASES AND WORD LENGTH

VICKY KANTZOU

Aristotle University of Thessaloniki

Abstract

While previous research has explored grammatical and lexical development in writing, little is known about how these aspects develop in Modern Greek, particularly across different text types. This study explores grammatical and lexical development in Modern Greek texts written by children, adolescents, and young adults. Focusing on expository texts in comparison to a narrative, it examines the influence of age, text type and task on the development of phrasal-level complexity and structural lexical complexity, in particular compositionality. The study analyzed three texts written by participants aged 10, 13, 16, and 23-35. We examined four indices: noun-dependent genitives per clause, noun-dependent noun phrases per clause (excluding personal pronouns), subjective/objective genitives per clause and word length (as a reflection of lexical compositionality). Results indicated that noun phrase complexity increased with age, with expository texts showing additional topic-based variation. Word length also increased with age across all text types, with one expository text eliciting significantly longer words than the others. These findings suggest that noun phrase structure, and noun dependent genitives in particular, as well as word length are informative measures of syntactic and lexical development in Modern Greek, and that expository texts may present unique challenges for developing writers. The results are discussed in relation to the discourse stance young and mature authors adopt in their texts.

Keywords: Modern Greek, literacy, later language development, writing, text type, noun phrase complexity, structural lexical complexity

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Corresponding author: Vicky Kantzou, School of Primary Education, Faculty of Education, Tower of the Faculty of Education, Aristotle University of Thessaloniki Campus, 54124, Thessaloniki, Greece, email: vickykantzou@eled.auth.gr

1. INTRODUCTION

Expository texts, whose primary objective is to convey information, play a critical role in education, as they constitute the vehicle through which knowledge is approached and negotiated in the various school subjects (Nippold & Scott, 2010; Scott & Balthazar, 2010). Their significance has, not surprisingly, attracted considerable research attention in recent years (Nippold, 2010). The production of expository texts presents a complex cognitive challenge, requiring language users to express abstract ideas and employ sophisticated language (Berman, 2018a). Development in the ability to produce expository texts is often contrasted with that of narratives, a text type in which content is structured around entities, their actions, and the motivations driving those actions (Berman & Slobin, 1994; Hickmann, 2003). Research has investigated differences between these two text types, highlighting the influence of text type on learners' language choices. Notably, research suggests that compared to narrative texts, which children and adolescents master earlier, the ability to produce effective expository texts continues to develop well into adulthood (Berman, 2018a, 2018b; Berman & Verhoeven 2002; Berman & Katzenberger, 2004; Tolchinsky, Johansson, & Zamora, 2002).

Studies on expository text development have focused on grammatical complexity, employing measures that reflect the use of syntactically complex structures at both the clausal and subclausal levels. Findings indicate that expository writing elicits greater use of subordination (Nippold et. al., 2007; Verhoeven et al., 2002) and progressively more intricate noun phrases (Ravid & Berman, 2010) compared to narrative texts. Noun phrases in particular, as Halliday (1993) observed, play a pivotal role in the informational density of expository discourse as “nominal elements in the clause are gradually taking over the whole semantic content” (p. 63) in scientific writing. This observation aligns with research by Biber (1989), which indicated that English expository texts feature a high concentration of nouns and attributive adjectives, further illustrating the critical role of noun phrases in establishing the information-rich structure essential to expository discourse.

Moreover, vocabulary emerges as a critical area of investigation regarding this text type. Expository texts exhibit greater lexical density and diversity, surpassing narratives and conversations (Lundine & McCauley, 2016). Additionally, they often include low-frequency, morphologically complex words, frequently formed through prefixes and suffixes that alter their meaning or syntactic role (Nagy & Townsend, 2012; Nippold & Sun, 2008). Biber (1989, p. 8) notes that longer words, characteristic of expository texts, reflect not only reduced authorial involvement but also opportunities for careful text revision.

Nevertheless, expository texts present great variety in terms of their macro and micro- structure (Lundine & McCauley, 2016). Studies in language development highlight the influence of task design on the means language learners employ to achieve grammatical and lexical complexity in their expository oral and written texts. Additionally, exploring how complexity manifests differently across languages is an

ongoing area of investigation, as the characteristics of each language impact the organization of texts at both the local and global levels (Jisa et al., 2002; Nir & Berman, 2010; Ragnarsdóttir & Strömqvist, 2005; Van Rijt et al., 2021).

In this context, this study examines the influence of text type and task on the development of phrasal-level complexity in Modern Greek expository and narrative texts. It specifically focuses on a prevalent syntactic construction, i.e. the noun dependent genitive. Known for their diverse functions and frequent presence within noun phrases, genitives are highly relevant for tracing linguistic development in Modern Greek. Furthermore, considering the established connection between syntactic and lexical complexity (Ravid, 2005), the study also explores a specific aspect of structural lexical complexity: compositionality. Bulté and Housen (2012, p. 28) define compositionality as "the number of formal and semantic components of lexical items". This dimension is closely linked to word length, a characteristic that differentiates texts based on their focus on information (Biber, 1989), at least in English. By investigating compositionality, the study aims to trace its development across the different text types under examination.

2. LITERATURE REVIEW

Narratives focus on agency and they typically consist of temporally and causally linked sequences of events, adopting a prototypical macrostructure which comprises elements such as the setting, an initiating event, internal responses, attempts, and direct consequences (Stein & Glenn, 1979). In contrast, expositional texts utilize hierarchical structures to present knowledge in a systematic manner (Grabe, 2002; Mosenthal, 1985). These texts exhibit diverse macrostructures, which have been categorized by Lundine and McCauley (2016) into at least six distinct subtypes: descriptive, procedural, enumerative, cause-and-effect, compare-and-contrast, and problem-solution. Moreover, an expository text may incorporate various rhetorical functions, such as "classification, comparison, definition, description, explanation, illustration, and persuasion" (Berman & Nir, 2010, p. 100).

In language development, expository texts are a later development as observed by Berman and Nir-Sagiv (2007), because they demand skills such as abstract reasoning, metalinguistic awareness, and thematic structuring, which are later achievements. Young learners are challenged by this text type as they need to convey content knowledge on abstract issues, rather than recounting familiar events as in a narrative. Moreover, maintaining coherence and organizing information systematically places an additional cognitive load on younger writers, making proficiency in this text type a later developmental achievement.

Importantly, text-building abilities across both genres continue to mature well into adulthood (Haim & Ravid, 2022). Berman (2018a), summarizing the findings of a cross-linguistic program on English and Hebrew, and drawing on research results from other languages too, proposes a developmental milestone between the ages of 16 and 19. She concludes that while younger ages show more similarities between

them, learners after the age of 16 show more similarities to adults. This finding applies to the texts' local level, e.g. vocabulary and syntax, as well as the overall organization of discourse. One of the significant changes occurring in late adolescence and documented across diverse languages is the transition from a discourse stance characterised by high involvement, personalisation, and subjectivity towards a more distanced, generalized, and objective perspective. Furthermore, mature language users possess the ability to strategically shift discourse stance within a single text. They can seamlessly integrate non-narrative, evaluative elements into their narratives, while conversely incorporating personalized, subjective features that express personal involvement into their expository writing (Berman et al., 2002).

It is important to note, though, that the diversity in the macrostructure of expository texts challenges the generalization of research findings on text type development to all individual types of expository texts (Nippold, 2010). In fact, comparative analysis of expository texts collected using different tasks shows differences between the texts in terms of the language they elicited (Nippold, et al., 2007; Kantzou, 2019, 2020).

2.1 Grammatical complexity and its development

One of the major research areas regarding this text type is grammatical complexity. It is important to acknowledge that the term 'complexity' has been used to denote several distinct constructs. For instance, Bulté et al. (2024) highlight the distinction between structural complexity and the cognitive demands associated with processing (difficulty).[1] In this paper, following Biber et al. (2020, p. 5) grammatical complexity is defined as

> the addition of structural elements to 'simple' phrases and clauses. That is, a 'simple' phrase or clause includes only obligatory elements (e.g., the headword in a phrase, or the subject, verb, and object in a clause). Structural additions to these patterns result in increasingly 'complex' grammar.

Traditionally the concept of grammatical complexity has been interpreted to refer to clausal complexity (Hunt, 1965, 1966). As a result, research into the development of expository and narrative texts has focused on this aspect of text construction. Delving into the use of subordination, relevant studies have yielded contradicting results with regard to expositions. Some studies have reported an age-related increase in the use of subordinate clauses (Nippold et. al., 2007; Verhoeven et al., 2002), while others have not (Myhill, 2008; Nippold et al., 2005). As far as the narrative is concerned, after the age of nine, children's syntactic skills take a leap forward. They start combining sentences into more complex units, allowing them to express ideas with

[1] *Complexity has also been used to refer to system complexity, i.e. to the linguistic system as a whole, comparing the number and types of grammatical distinctions made in different languages or dialects (e.g. Hawkins, 2004). With regard to the different entities complexity has been used to refer to, see Biber et al. (2023).*

greater depth and nuance. This is shown by an increase in linking multiple clauses together to create a single unit and in embedding clauses within each other (Berman, 2018b). However, as a study by Ravid and Cahana-Amitay (2005) indicates, with age narratives become less reliant on verbs and incorporate more complex noun phrases. This shift leads to a more distant and objective storytelling style, even for personal experiences.

Research on grammatical complexity at a phrasal level is more limited (Bulté & Housen, 2012), due to the need for more sophisticated technological tools for automatic annotation, that are not yet available for many languages, and the high cost of human labor for manual annotation, which is thus subject to existing resource constraints. Scott (1988) posits a positive correlation between age, schooling, and the development of phrasal complexity. This complexity manifests in increased phrase length, intricate internal structure, and a more sophisticated organization of words. Research has particularly focused on noun phrases in expository texts and scientific writing, as clauses in such texts increasingly depend on nominal elements to convey their entire semantic content (Halliday, 1993, p. 63). Ravid and Berman (2010) investigated the development of noun phrases' internal structure in Hebrew and English narrative and expository texts. Employing a novel and intricate method for categorizing noun phrases based on their semantic and syntactic complexity, they found an age-related increase in complexity, particularly in expository texts especially from high school onwards. This increase was associated with a greater number and variety of noun modifiers. Additionally, crosslinguistic differences were detected, with Hebrew noun phrases exhibiting greater complexity compared to English.

A renewed interested in noun phrase complexity has been triggered by Biber et al.'s (2011) developmental framework, suggesting a shift from finite dependent clauses to elaborate noun phrases as markers of academic writing development, with the latter being achieved "typically in adulthood" (p. 29). Studies investigating both first (Staples et al., 2016) and second language (Crossley et al., 2011; Díez-Bedmar & Pérez-Paredes, 2020; Taguchi et al., 2013; Staples & Reppen, 2016) academic writing, as well as studies encompassing both (Lan et al., 2022) within the English language, have shown that phrasal complexity increases as academic level increases, and that phrasal complexity is impacted by genre and discipline. In a recent study of children and adolescents aged 6 to 16, Durrant and Brenchley (2023) found that noun phrase development in English does not appear to be, as Ravid and Berman (2010) claim, primarily associated with late adolescence. Comparison of noun phrase complexity in year 11 writing with that in adult fiction and academic writing revealed only one component that was used consistently less by the child writers, i.e. noun pre-modifiers. Durrant and Brenchley (2023) suggested that this may be due to semantic challenges posed by the form, which is informationally dense and requires high levels of inference to unpack semantically. Interestingly, this structure is a late achievement in L2 acquisition as well (Parkinson & Musgrave, 2014).

Examining syntactic complexity in Modern Greek, Kantzou (2019, 2020) found that even 10-year-olds used more complex phrasal structures, evidenced by

increased clause length in expository writing compared to narratives. Interestingly, subordinate clause use didn't increase with age in expositions, suggesting that development could be better traced within clauses, not between them. Notably, clause length varied even within different subtypes of expository texts, highlighting potential task-specific influences. However, these studies did not delve deeper into the specific elements of phrasal structure in Modern Greek where developmental changes might be identified.

2.2 Lexical complexity

According to Ravid (2005, p. 339), linguistic complexity in texts can be deconstructed into two interdependent elements: lexical complexity and syntactic structure. She, thus, emphasizes the interplay between vocabulary and syntax, suggesting a 'lexicon-syntax interface.' In other words, her approach posits that both lexical choices and syntactic structures collaboratively contribute to the overall linguistic complexity of a text. Therefore, lexical complexity has been an area of research on language development has focused on. Rarely, however, has it been studied in connection with the development of grammatical complexity.

Lexical complexity, according to Bulté and Housen (2012, p. 28) is a multidimensional construct, encompassing four interrelated dimensions: density, diversity, sophistication, and compositionality. Lexical density reflects the proportion of content words to the total words in a text, capturing its informational content (Ravid, 2005). Lexical diversity measures the range of vocabulary employed, often calculated as the ratio of unique word types to tokens (Ravid, 2005). Lexical sophistication examines the depth and breadth of vocabulary knowledge, often assessed through corpus-derived frequency measures (Kyle & Crossley, 2015). Finally, lexical compositionality refers to the internal structure of words, including their morphemic and semantic components (Bulté & Housen, 2012).

In this study, the interest lies in compositionality as studies have shown a link between content words and syntactic structure. Notably, nominalizations, which are often morphologically complex words derived from verbs, adjectives, or adverbs through affixation, are considered a key resource for constructing extended noun phrases (Schleppegrell, 2001). Given that function words tend to be shorter than content words and that longer words are not only rarer but also structurally and conceptually more complex (Lewis & Frank, 2016; for Greek see Mikros et al., 2005), it is expected that developmentally words will become longer. Therefore, compositionality has been operationalized and investigated as word length, which is expected to be an effective developmental marker.

Indeed, Berman and her colleagues (Berman & Katzenberger, 2004; Berman & Nir-Sagiv, 2007) found that in English, polysyllabic words (three or more syllables) are a parameter that distinguishes age groups. Children under 13 used very few such words, while their systematic use begins at the age of 16. Additionally, the use of polysyllabic words was significantly greater in expository texts compared to narrative

texts. These trends were even more pronounced for tetrasyllabic words, which appeared only in the adults' expository texts. In another study, Strömqvist et al. (2002) explored the utility of word length in terms of the number of letters as a measure of lexical complexity. They found that this measure captured developmental changes primarily between the ages of 10 and 13, and between the ages of 17 and adulthood. However, the researchers caution that cross-linguistic comparisons using this measure should be made with care, as language-specific characteristics can influence the results.

2.3 Genitive in Standard Modern Greek

Standard Modern Greek maintains a four-case system: nominative, genitive, accusative, and vocative. Our focus here is the genitive case, which can be governed by verbs or can depend on nouns (noun-dependent genitive). Notably, noun-dependent genitives exhibit a wider range of functions in Standard Modern Greek compared to traditional demotic (Holton et al., 2012, p. 339). In older colloquial usage, the genitive of a noun phrase dependent on another noun was primarily used for possession. However, Holton et al. (2012, pp. 339-345) identify eleven distinct functions for noun-dependent genitive phrases. These functions include the possessive genitive (e.g., *το βιβλίο μου* – 'my book'), the genitive of purpose (e.g., *το μπουκαλάκι του νερού* – 'little bottle for water'), and the genitive of quality (e.g., *ζητήματα μεγάλης σημασίας* – 'issues of great importance).

Of particular interest to our research is the subjective/objective genitive, one of the functions identified by Holton et al. (2012). This type of noun-dependent genitive modifies abstract nouns. The modified noun can be "translated" as a verb, while the genitive phrase corresponds to either the subject or the object of that verb (*συγκέντρωση των απορριμμάτων* 'waste collection'). It's important to note that when the genitive element is a weak personal pronoun (e.g., *του* 'his/its', *της* 'her', *τους* 'their'), only two functions are typically expressed: the possessive and subjective/objective genitive (Holton et al., 2012).

3. AIM OF THE STUDY

Biber et al. (2011) argue that understanding language development requires a more subtle investigation of the language means employed by learners as well as their function. To date, research has primarily focused on the English language, with some attention paid to other languages such as Hebrew, Dutch, French, Icelandic (e.g. Ragnarsdóttir et al. 2002; Ravid & Berman 2010; Ravid & Cahana-Amitay, 2005), Swedish (e.g. Strömqvist et al., 2002) and Norwegian (Nygård & Hundal, 2024). It is imperative to expand the scope of investigation to encompass a broader range of languages, thereby enabling the identification of both commonalities and instances where the unique characteristics of each language exert a discernible influence.

With regard to Modern Greek, the findings of Kantzou (2019, 2020) with respect to the increase in clause length point to the direction of investigating grammatical complexity at the phrase level. Therefore, this study probes into the developmental paths of two written expository texts, in comparison to a narrative. Our particular focus of investigation lies on a noun phrase element that is ubiquitously used in Modern Greek discourse, the noun-dependent genitives. Given Biber et al.'s (2023, p. 356) remark that "complexity features functioning as noun-phrase modifiers are especially prevalent in informational writing", it is expected to be a prominent feature of expository texts, and one which differentiates language use in narratives. Among the various functions of the genitive, we further concentrate on the objective/subjective genitive. Given that expository discourse expresses abstract concepts and involves the use of abstract words, it was expected that its use would be even more sensitive to the text type.

As far as lexical compositionality is concerned, it has been operationalized and investigated as word length, since it has been shown that more common words tend to be shorter, while longer words are not only rarer but also structurally and conceptually more complex (Lewis & Frank, 2016; for Greek see Mikros et al, 2005). This holds true even for languages with a considerable degree of fusional morphology, like Modern Greek.[2] Moreover, given the relatively high grapheme-phoneme correspondence in the Greek writing system (Protopapas & Vlahou, 2009· Kendeou et al. 2013), we expect this index to effectively capture lexical compositionality. More specifically Modern Greek's consistent orthographic system ensures that word length, measured in graphemes, can reliably be used as an indication of phonetic length.

Therefore, the research questions were formed as follows:

- To what extent can age and text type predict the use of noun-dependent genitives?
- To what extent can age and text type predict the use of subjective/objective genitives?
- To what extent can age and text type predict word length, as measured by average word length in letters?

[2] *While alternative measures such as morphemes per word or syllables per word have been proposed by Bulté and Housen (2012), their application in this study was constrained by the absence of sophisticated technological tools for Modern Greek that can perform these calculations automatically. Word length, therefore, was selected as a viable alternative to capture aspects of compositionality.*

4. METHOD

4.1 Participants

This study required a corpus that would allow for a detailed examination of syntactic and lexical development across different age groups. To this end, the dataset was based on an existing collection of texts (Kantzou, 2019), which was expanded to include a larger number of participants in each sample group. The final sample consists of children and adolescents aged 10, 13, and 16, all native speakers of Modern Greek, with each age group comprising 20 participants (10 girls and 10 boys). The child and adolescent participants were all students in the fourth grade of elementary school, the first grade of middle school, and the first grade of high school, respectively, attending public schools in the greater Athens area. A group of adults aged 22-35 have also offered their texts. These participants had completed four to five years of formal education after high school at the time of data collection, having completed their university studies, and doing their masters' degrees.

4.2 Data collection

All participants were asked to produce three written texts, one narrative and two expository. The narrative was on a quarrel incident with a friend, while for the first expository text, participants were asked to present the qualities of a good friend. The second expository text was on the garbage problem, and participants were required to describe the situation and suggest solutions (see prompts in the Appendix). As a result, the first expository elicitation task was expected to elicit a text with a descriptive macrostructure while the second task aimed for a text with a problem/solution macrostructure.

The tasks were not graded, and participation was voluntary, with both students and their legal guardians informed of this. All topics used in the study originated from the thematic units that students cover in school and are representative of the written texts that they are typically asked to produce. The tasks were administered on separate days to avoid fatigue, and participants worked individually without access to any materials while writing.

No time or word limits were imposed, but participants were given a double-sided A4 sheet for each text, with additional sheets available if needed, as a guideline for expected length. Each task was completed during school hours, usually within one class session, under the supervision of the researcher, who had obtained permission from the Hellenic Ministry of Education. Since the texts were collected on different days, not all students who participated completed all three texts. Participants who did not produce all three texts were excluded from the research sample.

4.3 Data annotation and analysis

A corpus of narrative and expository texts, totaling 52,946 words, was compiled following the digitization and annotation of 240 participants' texts (Table 1). The CHILDES project tools (MacWhinney, 2000) facilitated the digitization and annotation process, which was conducted manually by the researcher. At first, all texts were annotated with regard to the clauses they consisted of. Following Hunt (1965), the term clause is used to refer only to finite clauses.

Table 1. The corpus of the study

Text types	Words
Narrative: The fight	20017
Expository: The qualities of a good friend	16025
Expository: The garbage problem	16904
Total	52946

Descriptive statistics on the length of the essays, measured by the number of words, were calculated and are presented in Table 2. During analysis, six outlier texts were identified, all of which were substantially longer than the other texts produced by participants in the same age group. Each outlier text was produced by a different participant. These texts were carefully examined to ensure they did not contain irrelevant material or typographical errors. After confirming their appropriateness, the decision was made to include them in the dataset, as they were considered natural variations within the sample, reflecting the range of written production across participants.

Table 2. Means, standard deviations and standard errors for text length in words in the narrative (N) and the expository texts (E)

Age	Text	N	Min	Max	Mean	Std. Dev.	SE
10-year-olds	The fight (N)	20	32	169	97.50	37.08	8.29
	A good friend (E)	20	26	190	95.35	40.85	9.14
	The garbage problem (E)	20	30	130	65.70	27.36	6.12
13-year-olds	The fight (N)	20	102	494	226.90	114.85	25.68
	A good friend (E)	20	44	277	137.25	57.92	12.95
	The garbage problem (E)	20	84	545	161.90	103.58	23.16
16-year-olds	The fight (N)	20	58	659	269.30	142.70	31.91
	A good friend(E)	20	121	337	219.65	59.93	13.40
	The garbage problem (E)	20	76	451	255.10	97.77	21.86
Adults	The fight (N)	20	173	1131	407.15	258.28	57.75
	A good friend (E)	20	139	826	349	212.87	47.60
	The garbage problem (E)	20	89	684	362.50	166.03	37.13

As far as the genitives are concerned, the annotation scheme used initially distinguished between noun-dependent noun phrases and noun-dependent weak pronouns. Subsequently, the noun dependent genitives were annotated in terms of the

function they served. Regarding the subjective/ objective genitives, at the beginning of the annotation process 10% of noun dependent genitives (250 cases) from all age groups were analyzed by an independent judge, who was a linguist and a veteran L2 Modern Greek teacher. The agreement rate between the researcher and the judge was 91% for the cases identified as subjective/ objective genitives. More specifically the researcher and the judge concurred on 63 cases (Cohen's kappa = .94). In the cases where there was disagreement, the judge and the researcher discussed their disagreements and reached a decision based on this discussion. Guidelines for the annotation of the rest of the corpus were created based on this discussion. To study the use of noun dependent genitives, the following measures were calculated: a) noun dependent genitives per clause (including weak pronouns in genitive) (Gen/C), b) noun-dependent noun phrases per clause (excluding weak pronouns in genitive) (Gen-noWP/C), and c) number of subjective/ objective genitives per clause (S-OG/C). Finally, with regard to lexical complexity, the average word length in letters was calculated using the Clan programs offered by the CHILDES project (MacWhinney, 2000). All datasets were tested for normality using the Shapiro Wilk W normality test, as the sample size was n<30. This test showed that the data were not normally distributed. Therefore, non-parametric tests are used in what follows.

5. RESULTS

5.1 Noun-dependent genitives

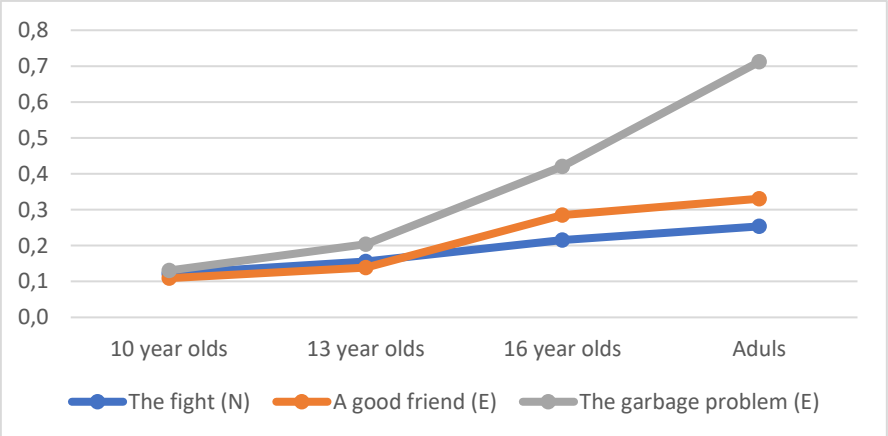
Table 3 presents the results concerning the calculated indices related to noun phrase in genitive usage. The impact of age is visually depicted in Figure 1, which demonstrates the development of the first index: the number of noun-dependent noun phrases in genitive per clause. The use of this construction clearly increases with age. Statistical analysis using the Kruskal-Wallis test revealed a significant main effect of age for all three texts (*The fight*: $H(3) = 12.853$, $p = 0.005$; *A good friend*: $H(3) = 29.309$, $p < .001$; *The garbage problem*: $H(3) = 44.591$, $p < .001$). Following the Kruskal-Wallis test, Dunn's post hoc tests with a Bonferroni correction were conducted to determine the locations of the significant differences. For the narrative text, the test identified a significant difference only between the 10-year-old group and the adult group ($p = .006$). For the expository text on the qualities of a good friend, both younger groups differed significantly from the older groups (10-year-olds vs. 16-year olds, $p = .002$; 13-year-olds vs. 16-year olds, $p = .033$; 10-year-olds vs. adults $p < .001$; 13-year-olds vs adults p = .001). A similar pattern was observed for the expository text on the garbage problem (10-year-olds vs. 16-year-olds, $p < .001$; 13-year-olds vs. 16-year-olds, $p = .012$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p < .001$).

Table 3. Means, standard deviations and standard errors of indices related to noun dependent genitives in the narrative (N) and the expository texts (E) (N = 20 per group)

Variable	Age 10			Age 13			Age 16			Adults		
	Mean	Sd	SE	Mean	Sd	SE	Mean	Sd	SE	Mean	Sd	SE
						The fight (N)						
Gen/C	0.12	0.10	0.02	0.16	0.09	0.02	0.22	0.12	0.03	0.25	0.11	0.03
Gen-noWP/C	0.02	0.04	0.01	0.03	0.04	0.01	0.05	0.06	0.01	0.10	0.05	0.01
S-OG/C	0.01	0.02	0.01	0.01	0.02	0.01	0.04	0.06	0.01	0.06	0.05	0.01
						A good friend (E)						
Gen/C	0.11	0.07	0.02	0.14	0.10	0.02	0.28	0.18	0.04	0.33	0.14	0.03
Gen-noWP/C	0.02	0.03	0.01	0.03	0.04	0.01	0.16	0.16	0.04	0.14	0.11	0.02
S-OG/C	0.00	0.00	0.00	0.01	0.01	0.00	0.05	0.08	0.02	0.06	0.07	0.02
						The garbage problem (E)						
Gen/C	0.13	0.16	0.04	0.20	0.22	0.04	0.42	0.18	0.04	0.71	0.33	0.07
Gen-noWP/C	0.06	0.06	0.03	0.15	0.18	0.04	0.33	0.16	0.04	0.61	0.31	0.07
S-OG/C	0.01	0.03	0.01	0.09	0.13	0.03	0.18	0.14	0.03	0.35	0.25	0.06

Note. Gen/C = noun-dependent genitives per clause (including weak pronouns), Gen-noWP/C = noun-dependent noun phrases per clause (excluding weak pronouns), S-OG/C =number of subjective/ objective genitives per clause, N = narrative text, E = Expository text

Figure 1. Noun-dependent genitives per clause (including weak pronouns), for narrative (N) and expository texts (E) for each age group



Regarding the second index, weak pronouns were excluded from the count, as they are commonly used as possessives. The pattern observed for the effect of age on the use of noun-dependent noun phrases in genitive mirrored that of the first index. There was a gradual increase in usage with age, with the most pronounced increase

in the expository text on the garbage problem. Interestingly, these genitives were virtually absent in the narrative texts, with limited usage detected only in the narratives produced by adult participants. Statistical analysis (Kruskal-Wallis test) indicated a significant main effect of age for all three texts (*The fight*: $H(3) = 25.405$, $p < .001$; *A good friend*: $H(3) = 35.161$, $p < .001$; *The garbage problem*: $H(3) = 48.236$, $p < .001$). Post hoc analysis (Dunn's post hoc tests with a Bonferroni correction) for the narrative revealed significant differences between all child and adolescent groups compared to the adult group (10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p = .001$; 16-year-olds vs. adults, $p = .010$). In the expository text on the qualities of a good friend, the 10-year-old and 13-year-old groups differed significantly from the 16-year-old and adult groups (10-year-olds vs. 16-year-olds, $p < .001$; 13-year-olds vs. 16-year-olds, $p = .001$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p = .001$). A similar picture emerges from the post hoc analysis of the expository texts on the garbage problem (10-year-olds vs. 16-year-olds, $p < .001$; 13-year-olds vs. 16-year-olds, $p = .025$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p < .001$).

The analysis of the subjective/objective genitive function also revealed an age-related increase in usage. This construction was employed sparingly in both the narrative and the expository text on the qualities of a good friend, with a slight increase observed with age (Figure 2). However, a sharper increase was evident in the expository text on the garbage problem. Statistical analysis using the Kruskal-Wallis test confirmed a significant effect of age across all three texts (*The fight*: $H(3) = 26.941$, $p < .001$; *A good friend*: $H(3) = 31.065$, $p < .001$; *The garbage problem*: $H(3) = 42.921$, $p < .001$). Post hoc analysis for the narrative revealed significant differences between the 10-year-olds and both the 16-year-olds ($p = .004$) and the adults ($p < .001$), as well as between the 13-year-olds and the adults ($p = .001$). A similar pattern emerged from the post hoc analysis of both the expository text on the qualities of a good friend (10-year-olds vs. 16-year-olds, $p = .018$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p < .001$) and the expository text on the garbage problem (10-year-olds vs. 16-year-olds, $p < .001$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p = .001$).

Aiming to examine the impact of text type and topic, a Wilcoxon signed-rank test was conducted (Table 4). The results demonstrated that the expository text on the garbage problem elicited significantly more noun-dependent noun phrases in the genitive case compared to both the narrative and the expository text on the qualities of a good friend in all groups aged 13 and above. The only other significant difference was found in the 16-year-old group, which used significantly more noun phrases in the expository text on the qualities of a good friend compared to the narrative. Moreover, according to Table 4, the expository text on the garbage problem elicited a significantly higher number of subjective/objective genitives per clause compared to both the narrative and the expository text on the qualities of a good friend in all age groups from 13 onwards. Finally, an interesting finding deriving from Table 4 is that noun dependent genitives within narratives predominantly comprised weak

personal pronouns across all age groups. Conversely, the text on the garbage problem exhibited a marked preference for noun dependent genitives containing a noun.

Figure 2. The subjective/objective genitive per clause (including weak pronouns), for narrative (N) and expository texts (E) for each age group.

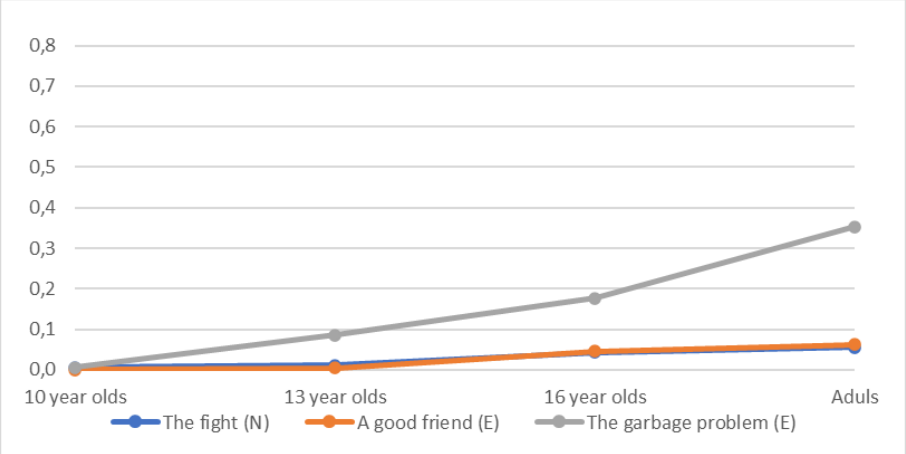


Table 4. The results of the Wilcoxon signed-rank test examining the impact of type and topic on the use of the noun dependent genitives

	10-year-olds		13-year-olds		16-year-olds		Adults	
	Z	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*
				The fight (N) - A good friend (E)				
Gen/C	26	.878	53	.975	191	.001*	137	.232
Gen-noWP/C	26	.878	53	.975	191	.001*	137	.232
S-OG/C	26	.878	53	.975	191	.001*	137	.232
				The garbage problem (E) - The fight (N)				
Gen/C	15	.142	25	.001*	0	< .001*	0	< .001*
Gen-noWP/C	6	.754	16	.004*	20	< .001*	20	< .001*
S-OG/C	1.5	1.000	98	.004*	168	< .001*	209	< .001*
				A good friend (E) - The garbage problem (E)				
Gen/C	49.5	.202	145	.001*	207	< .001*	208	< .001*
Gen-noWP/C	5	1.000	2	.002*	1	< .001*	1	< .001*
S-OG/C	1	.317	78	.002*	171	< .001*	179	.001*

Note. Gen/C = noun-dependent genitives per clause (including weak pronouns), S-OG/C =number of subjective/ objective genitives per clause, N = narrative text, E = Expository text
**p<0.05*

Overall, the study's findings so far reveal distinct age-related patterns, as the use of noun-dependent noun phrases in the genitive increased with age across all tasks, both narrative and expository. Adults and older adolescents employed these constructions more frequently than younger children. In particular, subjective/objective

genitive constructions showed age-related increases, with limited usage in narrative texts and in the expository text on the qualities of a good friend, but with a marked rise in the garbage problem text.

Moreover, the study identified text-type effects, with the expository text on the garbage problem eliciting significantly more genitives than either the narrative or the other expository topic. Narratives primarily featured weak possessive pronouns, whereas expository texts demonstrated a preference for noun-dependent genitives with nouns. For the expository texts, a turning point appeared between ages 13 and 16, when the influence of age became more pronounced, leading to significant differences between groups. Notably, topic also played a role, as the expository text on the garbage problem elicited the highest number of genitive constructions overall, as well as subjective and objective genitives specifically, compared to the other two texts.

5.2 Word length

Table 5 presents the results for word length in letters, which are further visualized in Figure 3. Interestingly, the expository text on the garbage problem elicited the use of longer words from all age groups in our sample. However, the mean word length kept increasing for this text as age increased. Investigating the impact of age, a Kruskal-Wallis test revealed a significant main effect of age for all three texts (*The fight*: $H(3) = 30.225$, $p < .001$; *A good friend*: $H(3) = 30.188$, $p < .001$; *The garbage problem*: $H(3) = 35.144$, $p < .001$). Post hoc comparisons were conducted within each text. For the narrative (story about a quarrel), no significant differences emerged between adjacent age groups. However, significant differences were observed for comparisons between more distant age groups, indicating a slow increase in word length with age (10-year-olds vs. 16-year-olds, $p = .036$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. adults, $p < .001$). The results for the expository text on the garbage problem followed a similar pattern (10-year-olds vs. 16-year-olds, $p = .001$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. 16-year-olds, $p = .042$; 13-year-olds vs. adults, $p < .001$). For the expository text on the qualities of a good friend, post hoc analysis revealed significant differences only between younger children (10-year-olds) and both the 16-year-olds ($p < .001$) and adults ($p < .001$).

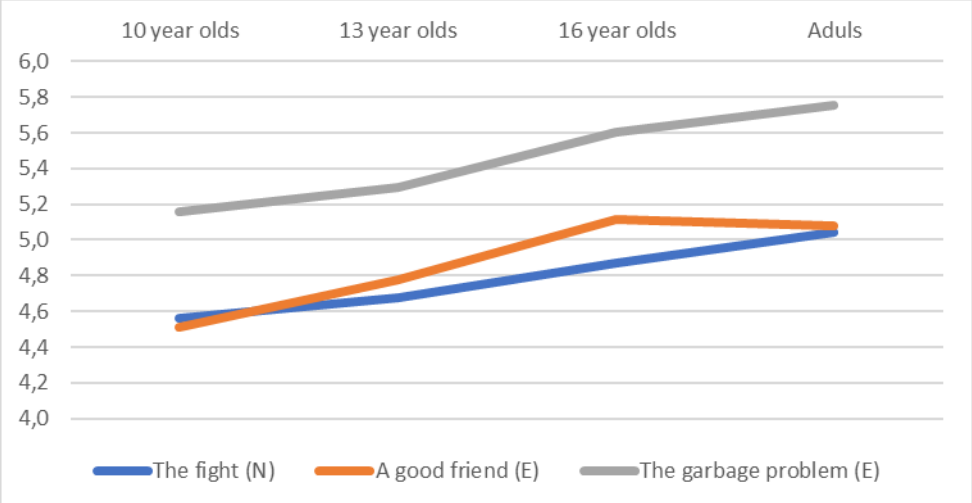
The findings related to the garbage problem text could, to some extent, be attributed to the influence of certain keywords for this topic that contain 10 or more characters. These are the words *σκουπίδια* 'garbage' and *περιβάλλον* 'environment' along with their morphological variations due to inflection. Notably, the word "garbage" appeared in the writing prompt provided to participants. To determine whether the difference in average word length was indeed due to these specific words, we removed them from the texts and recalculated the average word length. However, repeating the statistical analysis still yielded similar results; a main effect of age on average word length was detected (Kruskal Wallis, $H(3) = 41.259$. $p < .001$), and post hoc analysis confirmed the significant differences between more distant

age groups (10-year-olds vs. 16-year-olds, $p < .001$; 10-year-olds vs. adults, $p < .001$; 13-year-olds vs. 16-year-olds, $p = .022$; 13-year-olds vs. adults, $p < .001$).

Table 5. Means, standard deviations and standard errors for word length in letters in the narrative (N) and the expository texts (E)

Age	Mean	Std. Deviation	SE
	The fight (N)		
10	4.56	0.28	0.28
13	4.67	0.14	0.14
16	4.87	0.32	0.32
Adults	5.05	0.19	0.19
	A good friend (E)		
10	4.51	0.30	0.30
13	4.78	0.31	0.31
16	5.11	0.38	0.38
Adults	5.08	0.28	0.28
	The garbage problem (E)		
10	5.16	0.29	0.29
13	5.30	0.34	0.33
16	5.60	0.22	0.22
Adults	5.76	0.26	0.26

Figure 3. Mean word length in letters for narrative (N) and expository texts (E) for each age group



Examining text type effects within each age group using the Wilcoxon signed-rank test (Table 6), revealed that the expository task on the garbage problem elicited significantly longer words compared to the expository task on the qualities of a good friend and the narrative text across all age groups. Notably, the 16-year-old group

produced longer words in the expository text on the qualities of a good friend compared to their narratives, but this difference was not significant for any other group.

Table 6. The results of the Wilcoxon signed-rank test examining the impact of type and topic on word length in letters

	10-year-olds		13-year-olds		16-year-olds		Adults	
	Z	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*
The fight (N) - A good friend (E)	89	.550	142	.167	187	.002	122	.635
The fight (N) – The garbage problem (E)	210	<.001*	209	<.001*	210	<.001*	209	<.001*
A good friend (E) - The garbage problem (E)	210	<.001*	200	<.001*	205	<.001*	209	<.001*

Note. N = narrative text. E = Expository text
**p<0.05*

To confirm that there is no bias caused by the words *σκουπίδια* ('garbage') and *περιβάλλον* ('environment') in the text on the garbage problem, we repeated the statistical analysis excluding these words from the calculation of average word length. The results presented in Table 7 indicate that, even with these words removed, the text on the garbage problem continues to elicit the use of longer words across all age groups.

Table 7. The results of the Wilcoxon signed-rank test examining the impact of type and topic on word length in letters (excluding the words σκουπίδια 'garbage' and περιβάλλον 'environment' from the text of the garbage problem)

	10-year-olds		13-year-olds		16-year-olds		Adults	
	Z	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*
The fight (N) – The garbage problem (E)	190	.002*	204	<.001*	209	<.001*	206	<.001*
A good friend (E) - The garbage problem (E)	9	<.001*	36	.010*	24	.002*	5	<.001*

Note. N = narrative text. E = Expository text
**p<0.05*

All in all, the study highlights an age-related increase in average word length across all text types. The expository text on the garbage problem elicited the longest words, with mean word length increasing consistently with age. While topic-specific words (e.g., *σκουπίδια* "garbage" and *περιβάλλον* "environment") contributed to this trend, their removal did not alter the results. Statistical analysis confirmed significant

differences in word length between younger and older groups, particularly in the garbage problem text.

6. DISCUSSION

This study aimed to examine the development of different text types, focusing on the phrasal and lexical levels of text building skills, which are known to be interrelated. Focusing on the genitive case as a noun modifier, and especially on the subjective/objective genitive, we investigated a point of syntactic complexity where the effect of age and text type becomes apparent.

Regarding the noun dependent genitive case in general, this study revealed its limited use in personal narratives. Most instances involve expressions of possession with weak personal pronouns, as exemplified in Excerpt 1.

(1) Όλα άρχισαν μια μέρα που πήγα στο σχολείο

'It all started one day when I went to school'

και είχα το μπουκάλι με το νερό μου (gen-pro)[3] στην εξωτερική θήκη της τσάντας μου (gen-pro)

'and had my water bottle in the outer pocket of my bag'.

For expository texts, participants gradually used more complex noun phrases as their age increased. This aligns with findings from other languages with regard to noun phrase structure (Ravid & Berman, 2010) and the production of expository discourse in general (Berman & Verhoeven 2002; Berman & Katzenberger, 2004; Tolchinsky et al., 2002). However, the data reveals differences between the two expository texts. The text on the qualities of a good friend bears a strong resemblance to the narrative in terms of noun-dependent genitive usage, as it remains restricted for all age groups. Conversely, in the text discussing the garbage problem, participants employed an increasing number of noun-dependent genitives denoting abstract relations. This suggests that for the second expository task, participants created texts with characteristics of academic writing, where nouns hold greater significance than verbs (Bider et al. 2011). Participants' extensive use of subjective/objective genitives, in particular, reflects their preference for nominalizations and a distanced, objective, more generalized presentation of information. Agents performing the actions become less prominent, with emphasis placed on presenting information in an abstract and objective manner. The use of longer words in this text is unsurprising, considering the output of nominalizations often results in morphologically and conceptually complex words. In Excerpt 2, the adult author of the text on the garbage problem utilizes eight noun dependent genitives. Four of them depend on nominalizations

3 The following codes are used in the examples: gen= genitive, det=determiner, adj= adjective, no= noun, pro= pronoun.

(*αύξησης*–'increase', *ανακύκλωσης*–'recycling', *επαναχρησιμοποίησης* –'reuse', *μείωση- '*reduction', *εξοικονόμηση*- 'saving').

> (2) Λόγω της ραγδαίας αύξησης του πληθυσμού (gen-det, gen-no) του πλανήτη (gen-det, gen-no), οι εκτάσεις όπου αποθηκεύονται τα σκουπίδια έχουν περιοριστεί.
>
> 'Due to the rapid growth of the world's population, the areas where garbage is stored have been reduced.'
>
> Συνεπώς, έχουν υιοθετηθεί προγράμματα ανακύκλωσης (gen-no) και επαναχρησιμοποίησης (gen-no) των συσκευασιών (gen-det, gen-no) των προϊόντων (gen-det, gen-no) με στόχο την μείωση των σκουπιδιών (gen-det, gen-no), αλλά και την εξοικονόμηση πόρων (gen-no).
>
> 'Therefore, recycling and reuse programs of product packaging have been adopted aiming at the reduction of waste and the saving of resources.'

On the other hand, in the task on the qualities of a good friend the agent is an important aspect of text construction. The emphasis of the topic on a person, i.e. the good friend, their actions and traits of their character requires authors to use verbs (nine in Excerpt 3 as opposed to three in Excerpt 2) instead of noun phrases. In this manner, the agent of the events is foregrounded as the subject of the verbs.

> (3) Μερικά ακόμα χαρακτηριστικά του καλού φίλου (gen-det, gen-adj, gen-no) είναι να είναι πρόσχαρος με τους φίλους του (gen-pro) και συμπονετικός ιδιαίτερα στις ευαίσθητες στιγμές. […]
>
> 'Some more characteristics of a good friend are: being cheerful with his friends and being compassionate especially in sensitive moments.' […]
>
> Ο φίλος ο καλός συγχωρεί τα λάθη σου (gen-pro) και σέβεται την προσωπικότητά σου (gen-pro).
>
> 'A good friend forgives your mistakes and respects your personality'.

It must be noted that, developmentally, the use of noun dependent genitives apart from possessives is a later achievement as they appear in significant numbers at the age of 16 onwards. This may be due to the variety of meaning relationships encoded by the noun dependent genitives, as noted by Holton et al. (2012). The semantic relationship between the modified noun and the modifier may pose difficulties to language learners. A similar explanation regarding the later usage of noun premodifiers in English has been proposed by Durrant and Brenchley (2023). In addition to this explanation, I would like to argue that this later achievement is connected to Berman's conclusions regarding the development of discourse stance. More specifically, the emphasis on noun phrases and the organization of semantic content around them (Halliday, 1993) is a means of adapting a distanced perspective of the topic discussed. Previous research has shown that this is a later achievement in learners' text building skills development (Berman, 2018a; Berman et al., 2002).

As learners acquire the ability to adopt this perspective, they begin to integrate such elements into their narratives, which explains the rising numbers of noun

dependent genitives in the adult group. Excerpt 4 is derived from the narrative of a 23-year-old adult male. It constitutes a generalized evaluation of human relationship conflicts that incorporates abstract nouns (*πορεία* 'course', *ανανέωση* 'renewal') and noun-dependent genitives. This finding aligns with observations made by Berman et al. (2002) concerning the mature language user's ability to skillfully alternate discourse stance within the same text.

(4) Λέγεται ότι μια φιλία για να αντέξει στον χρόνο οφείλει να δοκιμαστεί.

It is said that a friendship must be tested to endure the test of time.

Μια δοκιμασία που δεν την επιλέγουν συνειδητά οι αληθινοί και εγκάρδιοι φίλοι, αλλά προκύπτει ξαφνικά στην πορεία της φιλικής σχέσης (gen-det, gen-adj, gen-no).

This test is not one that true and sincere friends consciously choose, but rather one that arises unexpectedly in the course of their friendship.

Μια δοκιμασία που για άλλους μπορεί να αποτελέσει την αφορμή για ανανέωση της φιλίας (gen-det, gen-no) προς το καλύτερο, ενώ για άλλους να αποβεί μοιραία.

For some, this test can be an opportunity to renew their friendship for the better, while for others it can be fatal.

An age effect was observed with regard to word length as an operationalization of lexical compositionality for all texts. A statistically significant difference was found between the younger participants and the 16-and-over age groups, as adolescents and adults appear to favor significantly longer words in their written texts. These findings are consistent with those of Berman and Katzenberger (2004), Berman and Nir-Sagiv (2007), and Strömqvist et al. (2002) for other languages, and are further confirmed here for Modern Greek. Moreover, the text on the garbage problem, which elicited more noun dependent genitives, elicited longer words as well as compared to the other two texts. Example 2 above, from an adult participant, is characteristic of the word length in this text. As expected, the longer words in this excerpt contain multiple morphemes. For instance, the word *επαναχρησιμοποίησης* 'reuse' is a nominalization from the verb *επαναχρησιμοποιώ*, with the addition of the suffix *-ση*. The verb itself consists of the prefix *επανα* – 're' and the composite verb *χρησιμοποιώ* 'use,' which is derived from *χρησιμ(ος)* 'useful' and *ποιώ* 'do'.

7. PEDAGOGICAL IMPLICATIONS

This study's findings have implications for language pedagogy, particularly writing instruction. The constructions examined in this study not only reflect syntactic and lexical development, but they are also indicative of the nuanced choices writers make with regard to perspective taking. Incorporating these insights into teaching aligns with the "grammar as choice" framework (Myhill, 2021a; 2021b), which emphasizes empowering students to see grammar as a toolkit for creating meaning rather than a rigid system of rules. For instance, the increasing use of extended noun phrases containing nominalisations and noun dependent noun phrases in genitive

denoting abstract relations in older students' expository texts mirrors the ability to adopt a more distanced and objective stance, a crucial feature of academic writing. Pedagogically, this suggests the need for teaching strategies that emphasize the rhetorical effects of grammatical choices, fostering metalinguistic awareness and enabling students to tailor their language to specific audiences and purposes.

Moreover, the emphasis on grammar as a resource for creating meaning calls for the integration of writing tasks that encourage students to explore how language works in context. By focusing on text types that challenge younger writers—such as expository texts addressing complex topics like environmental issues—educators can focus on how to construct arguments with greater abstraction and cohesion. The pedagogical approach of "grammar as choice" advocates for classroom discussions that examine the rhetorical impact of grammatical decisions, enabling students to see their writing as a dynamic process of making meaning (Newman, 2024). This aligns with the developmental trajectory observed in this study, where older students demonstrated a growing ability to balance personal expression with academic rigor. The connection of this research to teaching practices, however, requires further exploration in future studies, with regard to its effectiveness.

8. CONCLUSION

This research underscores the intricate interplay between learners' developing linguistic system and the academic literacy process in shaping text writing. Students progressively acquire the ability to maintain an objective, distanced, and generalized stance when conveying information and to background the agent responsible for actions. The use of noun dependent genitives in Modern Greek has risen as a sensitive indicator of this developmental process. At the same time, older participants demonstrate flexibility in utilizing available grammatical structures to emphasize agency when the task demands it. Vocabulary development acts as a critical catalyst in this process, as items are constantly added to the writers' productive vocabulary and children master the derivational morphology mechanisms. This equips learners with a broader range of structurally and conceptually complex words, enabling them to present information from a more distanced perspective. Furthermore, the study emphasizes the challenges associated with generalizing solely based on text type. Interpreting research findings necessitates careful consideration of how the specific task influences the results.

One limitation of this study concerns the operationalization of compositionality as word length. While word length serves as a proxy for structural and conceptual complexity and aligns with observations from developmental studies on other languages, additional measures such as morphemes per word or syllables per word could provide a more nuanced analysis. However, the absence of advanced technological tools for Modern Greek hindered the use of these more granular measures. Future research should explore these alternatives to provide a richer assessment of lexical compositionality.

Another limitation of this study is the lack of an evaluation of learner success and effectiveness in utilizing the examined noun phrase modifiers throughout their language development journey. Undoubtedly, the path towards fully leveraging these modifiers involves trial and error, with varying degrees of success. A similar pattern is likely to emerge in vocabulary development as learners refine their language production mechanisms. This represents both a limitation of the current study and a potential avenue for future research endeavors.

Finally, one more limitation of this study lies in the lack of differentiation between repeated uses of the same structure and instances of diverse types of noun-dependent genitives. Additionally, the analysis did not account for distinctions between conventionalized expressions and more creative or original uses of the noun-dependent genitives. This may have obscured the extent to which participants demonstrated innovation in their syntactic choices, potentially conflating routine uses with more sophisticated applications of the structure. Future research could explore these nuances for a more detailed understanding.

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APPENDIX: THE WRITING PROMPTS

Topic 1 – Narrative: Μάλωσες ποτέ με έναν καλό σου φίλο / μια καλή σου φίλη; Τι έγινε ακριβώς; Γράψε την ιστορία. (Have you ever had an argument with a good friend? What happened? Write about it.)

Topic 2 – Expository: Ποια είναι τα χαρακτηριστικά ενός καλού φίλου / μιας καλής φίλης; (What are the qualities of a good friend?)

Topic 3 – Expository: Οι άνθρωποι παράγουν όλο και περισσότερα σκουπίδια. Εξήγησε το πρόβλημα. Υπάρχουν λύσεις για το πρόβλημα αυτό; (People are producing people are producing increasing amounts of waste. Explain the problem. Are there any solutions to this problem?)