Published in the United States of America by
IGI Global
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Library of Congress Cataloging-in-Publication Data

Names: Garces-Manzanera, Aitor, 1993- editor. | Carrillo Garcia, Maria Encarnacion, 1970- editor.
Title: New approaches to the investigation of language teaching and literature / Aitor Garces-Manzanera, and Maria Encarnacion Carrillo Garcia, editors.
Description: Hershey PA : Information Science Reference, [2022] | Includes bibliographical references and index. | Summary: "The major objective of this book is to present an overview of the on-going methodological tools, practices, research designs, and strategies used in language and literature teaching at all education stages and to provide education researchers and practitioners with empirically sustained evidence of teaching strategies that may be implemented in the language classroom"-- Provided by publisher.
Identifiers: LCCN 2022033985 (print) | LCCN 2022033986 (ebook) | ISBN 9781668460207 (hardcover) | ISBN 9781668460245 (paperback) | ISBN 9781668460214 (ebook)
Subjects: LCSH: Language and languages--Study and teaching. | Second language acquisition.
Classification: LCC P51 .N469 2022 (print) | LCC P51 (ebook) | DDC 407.1--dc23/eng/20220917
LC record available at https://lccn.loc.gov/2022033985
LC ebook record available at https://lccn.loc.gov/2022033986

This book is published in the IGI Global book series Advances in Educational Technologies and Instructional Design (AETID) (ISSN: 2326-8905; eISSN: 2326-8913)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Table of Contents

Chapter 9
Comparing Individual vs. Collaborative Writing in Spanish EFL Secondary Education:
Insights From CAF Measures, Propositional Complexity, and Communicative Adequacy

Olena Vasylets
University of Barcelona, Spain

Raquel Criado
University of Murcia, Spain

Joaquín Gris-Roca
University of Murcia, Spain

ABSTRACT

The aim of this study was to compare the quality of L2 writing performance in collaborative and individual writing conditions. A group of L1 Spanish secondary-school learners of English as a Foreign Language (EFL)–an under-researched population in L2 writing–were divided into individual (n = 26) and collaborative (n = 34) writing conditions. The 43 texts, written as response to a problem-solving task, were analysed in terms of accuracy, lexical and syntactic complexity, propositional complexity (idea units), fluency and communicative adequacy. In contrast with the previous findings from the literature, results refute the beneficial effects of collaborative writing on accuracy and do not confirm the similarities in syntactic complexity between both writing conditions, given the superiority of the collaborative one. These findings will be explained by drawing from the learning affordances provided by collaborative writing and certain methodological aspects. Future lines of classroom-based research and pedagogical implications will be indicated.

DOI: 10.4018/978-1-6684-6020-7.ch009

INTRODUCTION

In modern literate societies, the acquisition of writing skills has become an indispensable requisite of a fully-functional language user. For second language (L2) learners, the writing skill constitutes an important goal to acquire (i.e., learning-to-write aim). Importantly, performing L2 writing tasks can also have an additional benefit of advancing general L2 proficiency in special ways (writing-to-learn dimension) (Manchón, 2013; Vasylets et al., 2019). Written activities, however, can be performed under individual or collaborative conditions. This basic distinction can have important consequences for both the learning-to-write and writing-to-learn dimensions, as these two writing conditions represent very different sites for task performance and learning. One of the ways to test differences between individual and collaborative writing conditions is by comparing their outcomes (i.e., written texts) in terms of complexity, accuracy, and fluency (Storch, 2011; 2013). Previous studies have shown that accuracy tends to be higher in collaborative writing, but the findings for fluency and grammatical complexity are less conclusive (Elabdali, 2021). Moreover, to our knowledge, only two studies have looked at lexical complexity measures, and there is no previous research which has examined differences between the two writing conditions in terms of propositional complexity or communicative adequacy. In addition, the vast majority of studies that examined the effects of collaborative writing on the quality of students' texts have focused on university students (Elabdali, 2021; Zhang & Plonsky, 2020). To fill this research gap, this study aims to explore the potential differences in L2 texts written by L2 English secondary-school students in collaborative and individual conditions at three different levels: (a) the level of communicative efficiency of the performance (operationalized as communicative adequacy); (b) semantic level, which we explore via the assessment of propositional complexity (idea units); and (c) linguistic level, which is assessed by means of the measures of grammatical and lexical complexity, fluency, and accuracy.

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Individual L2 Writing

The theoretical bases for the benefits of individual writing activities can be found in the language-learning potential of L2 writing theories, in which L2 writing represents a tool for learning an L2. That is, by performing L2 writing activities, learners do not only practice and improve their L2 writing competence, but they also advance their general L2 proficiency in special ways (Manchón, 2013; Vasylets et al., 2019). The language-learning potential of L2 writing research has also a natural affinity with the investigations of the way writing can contribute to intellectual development (Applebee, 1984) or support academic learning (Tynjälä et al., 2001).

The specificity and efficiency of L2 writing as a language learning site is attributed to various factors. The premise is that the slowness of writing and its self-paced nature allow to reduce the online pressures inherent to language production in real time. Thus, written conditions are believed to offer a favourable environment to employ attentional resources and metacognitive strategies more flexibly and to engage learning-conducive processes in an efficient and strategic way. Additionally, the visible text serves as an extension of working memory, which also alleviates the online production pressures and permits writers to effectively attend to both content and linguistic form. Also, as pointed out by Vasylets et al. (2019), visible written texts can induce L2 users to set up more complex goals and produce *pushed*

output (Swain, 2005), characterized by higher accuracy, cohesion, and complexity. Writers might also be pushed to produce a comprehensible and coherent discourse because of the displacement in time and place of the intended audience, which will consume the written message a certain time after its creation and without the additional help of gestures or prosodic devices.

Finally, the problem-solving nature (and the concomitant difficulty) of some writing tasks is believed to induce deeper linguistic processing, accompanied by the engagement of learning-beneficial processes such as noticing, cognitive comparison, or metalinguistic reflection (see also, Byrnes & Manchón, 2014). In sum, written conditions are believed to favor the engagement of learning processes and also push learners to produce accurate and coherent discourse. The empirical evidence for the LLP of individual L2 writing tasks comes mainly from the task modality studies, which contrast the quality of L2 production on the same tasks performed orally versus in writing. While the results for accuracy and grammatical complexity have been mixed, the overall findings from this strand have shown that lexical complexity is consistently higher in the written modality (Ellis & Yuan, 2004; Vasylets et al., 2017; 2019), which provides evidence that the latter can induce learners to create a complex pre-verbal plan which calls for the appropriately complex vocabulary to realize it, with the concomitant positive consequences for L2 production and, by extension, for L2 development.

Collaborative L2 Writing

While individual activities require learners to produce output, collaborative writing provides learners with opportunities to practice both language and interaction, which diversifies the opportunities for language learning. Consequently, while the support for the language-learning benefits for individual writing comes mainly from the cognitive theoretical paradigm, collaborative writing is also supported by the sociocultural perspective on SLA, which emphasizes the role of interaction and peer-collaboration during L2 development (Lantolf et al., 2015).

The sociocultural theory views learning as a socially situated activity, in which higher cognitive functions first emerge on the social plane, and only later are internalized on the personal mental plane (Vygostsky, 1978). From this perspective, interaction and collaboration play a vital role as learners provide assistance to each other, share ideas, and pool their knowledge together, which allows them to surpass their individual levels of competence. Under the influence of the sociocultural views on learning, Swain (2006) has reconsidered the original conceptualization of the construct of pushed output, by putting a greater emphasis on the role of collaborative dialogue, further termed as *languaging* in L2 development.

Thus, one of the features which makes collaborative writing essentially different from individual writing is the opportunity to engage in oral interaction in the pre-writing phase. This interaction is believed to be of vital importance as it provides learners with the opportunity to co-construct new knowledge and also consolidate existing knowledge. Therefore, language is converted into a cognitive tool to reflect on language, engage in problem-solving and co-construct new knowledge, mediating, in this way, L2 development. Importantly, the power of collaborative writing is enhanced by the presence of the visible text, which represents an additional artifact, together with the verbalized oral speech, which is available for examination and revision during the process of *languaging* (Storch, 2013). It is also important to highlight that the success or failure of a collaborative activity may depend on the collaborative competence of the members of the dyad/group (Nokes-Malach et al., 2012). During collaboration, learners have to actively engage in agreed processes of interaction, which entails, inter alia, decision-making, generating solutions, recognizing the right solutions and rejecting the wrong ones. To perform these

activities successfully, learners need numerous abilities, such as interpersonal communication skills strategies to cope with the social and cognitive demands of team interaction (Wood & Gray, 1991), as well as knowledge of the domain (Nokes-Malach et al., 2012), which could be defined as linguistic and genre knowledge in the case of an L2 writing task. Another important asset is a high level of strategic competence, which is instrumental in managing the fluctuating and unpredictable process of collaboration and shared knowledge building (Friend & Cook, 2014). In sum, the level of collaborative competence may determine the quality of the outcome of the collaborative activity.

The next section includes a review of the empirical evidence for the effects of collaborative writing in comparison with texts produced individually. Importantly, it should be taken into account that we will focus on studies that analysed collaboratively and individually written products instead of i) the effects of CW on subsequent individually written texts (e.g., Bueno-Alastuey & Rodero Albaiceta, 2019; Bueno-Alastuey et al., 2022; Chen, 2019) and ii) the effects of collaborative writing without comparing it with individual writing (e.g., Hidalgo & Lázaro-Ibarrola, 2021).

Empirical Comparison of Individual and Collaborative L2 Writing

The experimental paradigm employed to compare benefits of collaborative and individual writing typically involves the comparison of the complexity, accuracy and fluency (CAF) measures of L2 individually and collaboratively created written texts.

In an early study with ESL university students from various L1 backgrounds (predominantly Asian), Storch (2005) investigated the impact of collaboration on the performance in a short composition task based on a graphic prompt. As compared to the individual writings, the texts created by pairs were shorter, but exhibited a tendency towards a better task fulfilment (content and structure as assessed holistically on a 5-point scale) and higher accuracy (percentage of error-free clauses, errors per words; errors in spelling and punctuation not included) as well as grammatical complexity (measures of embeddedness). Another relevant finding was that individually written texts were more detailed, while collaborative texts exhibited a clearer focus. Nevertheless, the conclusions of this study were merely suggestive, as the differences between the two conditions were not statistically significant, which could be explained, inter alia, by a small number of the participants, as only seven pairs and five individual learners took part in the study.

In a subsequent study, which involved participants with a similar profile, Storch and Wigglesworth (2007) compared the performance of 24 pairs and 24 individual writers on two tasks, an argumentative essay and a report. There were no differences in terms of grammatical complexity (proportion of clauses to T-units, proportion of subordinate clauses to clauses) and fluency (number of words, length of T-units), but the collaborative texts were significantly more accurate (proportion of error-free clauses to clauses, proportion of error-free T-units to all T-units). On the basis of these findings, the authors concluded that collaborative writing may not lead to more grammatically complex and longer texts, but it does have benefits for the accuracy of production. Similar results were obtained by Wigglesworth and Storch (2009) in a larger-scale study, which compared the argumentative essays of 48 individual writers and 48 pairs. As in previous investigations, fluency and grammatical complexity did not differ in the two conditions, but the texts written by the pairs were significantly more accurate (percentage of error-free T-units and clauses).

A more recent study by Fernández-Dobao (2012) compared individual writing ($n = 21$) with the texts created by 15 pairs and with the texts created by groups of four ($n = 15$ groups). The participants were intermediate learners of Spanish with predominantly L1 English. The analysis showed that there

were no differences in terms of lexical complexity (segmented type-token ratio) and syntactic complexity (overall, subclausal and complexity via subordination). Individual texts were longer than the texts produced by pairs. Findings for accuracy (ratio of error-free clauses and T-units, errors per words) were rather intricate. Overall, groups outperformed pairs and individuals in terms of accuracy. However, the type of errors also mattered, as the difference was significant for grammatical errors, but not for mechanical errors. And there was only a marginal difference between groups and pairs in terms of lexical errors. Importantly, the texts of pairs and individuals did not differ significantly in terms of accuracy, even when different types of errors were examined separately. Significant findings for accuracy were also obtained by McDonough and García-Fuentes (2015) with 26 Spanish learners of EFL (age: 17–23). Half of the subjects were assigned to the collaborative condition, while the other half performed the task as individual writing. In both conditions, the participants were assigned 20 minutes to perform two argumentative writing tasks (with the suggested length of 100–150 words). While working on the task, the subjects had access to a monolingual English dictionary. Written texts were assessed by means of an analytic rubric with three categories (content, organization, and language). The researchers also performed manual coding of different types of clauses to assess complexity. For accuracy, the number of errors for the total number of clauses and errors per text were calculated, including errors in syntax, morphology, word choice, spelling and punctuation, but excluding errors in paragraph formatting. There were no significant differences between the two conditions in terms of the rubric ratings or in terms of the use of clauses, but accuracy was higher in the collaborative condition.

One of the very few studies located within secondary education, specifically in Spain, is Bueno-Alastuey & Martínez de Lizarrondo (2017). Their work is a partial replication of Fernández-Dobao's (2012) in that they analyzed texts written individually ($n = 18$), in pairs ($n = 10$) and in triads ($n = 7$). All the students (age: 12–13) wrote descriptive texts in a maximum of 25 minutes. The researchers (manually, it seems) measured students' fluency (total number of words), syntactic complexity (number of words per clause, number of words per T-unit and number of clauses per T-unit) and accuracy (number of total error-free clauses per total number of clauses, error-free T-units per total number of T-units, total of errors per total number of words, number of grammatical errors per total number of words, number of lexical errors per total number of words and number of total mechanical errors per total number of words). Contrary to the general tendency in previous research and to Fernández-Dobao's (2012) results, their findings showed that texts written collaboratively tended to be longer than the individual ones and that higher complexity via subordination was achieved in individually written texts. In accordance with other studies, accuracy (both global and specific measures) tended to be higher in collaborative writing, especially in triads. However, none of these results were statistically significant.

In a recent study, Villarreal and Gil-Sarratea (2020) explored differences in the collaborative and individual texts written by the Basque/Spanish learners of L2 English (age 16–17) with varied levels of L2 proficiency. The writing task was an argumentative essay. Pairs and individuals were assigned 40 and 25 minutes accordingly to write the essay, and there was a length restriction of 150 words. The essays were analyzed by employing the rubrics for content, structure, organization, and register. For accuracy, grammatical, lexical, spelling and punctuation errors were assessed by means of the ratio of error-free clauses, error-free T-units and number of errors to words. To assess fluency, number of words, number and length of T-units and clauses were employed. Grammatical complexity was gauged using the measures of embedding, and type-token ratio and D-value were used for lexical complexity (specifically, lexical diversity). As in many previous studies, the texts did not differ in terms of fluency or complexity. Certain benefits were found for accuracy in the collaborative condition, but again these benefits were

contingent on the type of error. Thus, there were fewer errors overall and fewer grammatical errors in the texts written by pairs, but there were no differences in terms of lexical and mechanical errors.

The effects of collaborative and individual writing together with exact (STR) and procedural (PTR) task repetition on CAF measures and holistic ratings based on a 5-scale global evaluation scheme were analyzed in Lázaro-Ibarrola and Hidalgo (2021). Fifty-nine Spanish children (aged 11) were distributed into two collaborative and two individual writing condition groups. All participants wrote an L2 English narrative composition based on a five-picture story task. A week later, one individual writing group and one collaborative writing group wrote the same text while the remaining two groups engaged in procedural task repetition. The CAF measures were as follows: for syntactic complexity and proportion of clauses to T-units and percentage of dependent clauses of total clauses; for lexical complexity, lexical density; for fluency, average number of T-units, clauses and words per text and for accuracy, percentage of error-free T-units and clauses. Results showed no advantages for collaborative writing and scarce improvements accounted for by task repetition. Contrary to previous research, non-significant differences between individual and collaborative writing for accuracy were revealed (in either testing time). In line with previous studies, a similar pattern happened in complexity, except for an isolated positive effect of the STR pairs at time 1 for the mean number of dependent clauses per clauses, while, as opposed to Villarreal and Gil-Sarratea (2020), the PTR individuals' lexical density at time 2 significantly increased. As for fluency, in parallel with the previous research, there were not any statistically significant differences between individual and collaborative writing and the single significant positive advantage at time 2 occurred for PTR pairs in terms of clauses per text. Regarding holistic ratings, the only significant advantage emerged at time 2 for the STR groups.

Summary of Findings, Gaps and Limitations

The review of available studies clearly shows that this field is not devoid of systematic empirical investigations comparing the quality of L2 output in collaborative and individual writing conditions. Overall, the research has obtained mixed results for complexity, no differences for fluency, and generally higher accuracy in collaborative writing. However, these findings have to be interpreted with caution because of a number of methodological problems and limitations.

Concerning the attested higher accuracy in collaborative writing, it should be acknowledged that all the studies reviewed in the previous section are small-scale in nature and that some of them employ methodologically problematic measures. For example, to assess accuracy, Wigglesworth and Storch (2009) employed ratios of error-free units, which is a measure widely criticized in the literature (Skehan & Foster, 2007). On the other hand, the studies which employed more objective measures of accuracy (e.g., errors per words) have found no significant differences between individual and collaborative writing in pairs (Fernández-Dobao, 2012; Bueno-Alastuey & Martínez Lizarrondo, 2017), or have revealed an intricate picture with pair collaboration benefiting some types of errors, but not others (Villarreal & Gil-Sarratea, 2020).

The findings for complexity are also rather limited. Concerning grammatical complexity, previous investigations have predominantly focused on subordination, so less is known about the differences between collaborative and individual writing in terms of coordination or nominal complexity. Only two studies have measured lexical density and diversity (respectively, Lázaro-Ibarrola & Hidalgo, 2021; Villarreal & Gil-Sarratea, 2020), but, to our knowledge, no previous investigation has looked into lexical sophistication.

Importantly, none of the previous studies have looked into the differences in terms of propositional complexity, which refers to the amount of information which a speaker or writer encodes to convey the intended message (Ellis & Barkhuizen, 2005). Propositional complexity, typically operationalized in terms of idea units, constitutes an under-researched dimension in SLA (Bulté & Housen, 2012). By analysing production for propositional complexity, we tap into the semantic level of discourse, which constitutes an important dimension of the global construct of L2 complexity (Vasylets et al., 2017, 2019).

Another performance dimension which has not yet been explored in the investigations comparing collaborative and individual writing is the dimension of communicative adequacy, defined as the degree to which learners' performance is successful in achieving the communicative goal of the task (Pallotti, 2009). Communicative adequacy represents an independent construct; its relationship with the CAF dimensions is not straightforward and it may depend on other factors, such as the mode of production (Vasylets et al., 2020). For this reason, the analysis of performance for communicative adequacy together with the traditional CAF dimensions would give a more complete picture of the nature and quality of L2 performance in different tasks and conditions (see also Kuiken & Vedder, 2017).

It is also important to highlight that most of the previous studies have overwhelmingly focused on the performance of young adults, who were intermediate-level university students (Zhang & Plonsky, 2020), with the exceptions of Bueno-Alastuey and Martínez de Lizarrondo (2017) and Villarreal and Gil-Sarratea (2020), who studied secondary-school learners, and Lázaro-Ibarrola and Hidalgo (2021), who examined primary-school learners. This narrow focus makes it difficult to generalize the majority of past findings to the latter age group, whose cognitive maturity, years of formal L2 instruction and L2 proficiency are different from those of university students.

THE STUDY

Purpose and Research Questions

In light of the previous research findings and the identified gaps and limitations, the aim of this investigation is to further our understanding of the specificity of performance in L2 collaborative and individual writing as performed by secondary-school learners, an age group who is underrepresented in L2 writing research. For this, we compare the quality of the L2 individually and collaboratively written texts as assessed by means of both discrete and holistic measures of performance. While previous research has overwhelmingly focused on the assessment of the linguistic dimension of the written texts, this study additionally assesses the semantic level of performance (idea units) and the level of communicative efficiency or adequacy in L2 performance. We also assess the linguistic quality of L2 texts in a more nuanced way, as we differentiate between types of errors and examine grammatical and lexical complexity multidimensionally.

The following research question was formulated:

1. To what extent are there any differences between Spanish L2 English secondary-school learners' individually and collaboratively written texts in terms of accuracy, fluency, complexity (lexical, syntactical and propositional) and communicative adequacy?

Context and Participants

Data were collected from a group of L1 Spanish secondary-school participants ($n = 60$, 40 females, 20 males, mean age 13.6, age range 13–15) from a centre whose selection was guided by convenience sampling. The students had received formal EFL instruction for nine years on average, and at the time of the data collection they were attending compulsory general EFL classes three hours per week. In order to measure their L2 proficiency, the participants completed the Oxford Placement Test (OPT; Allan, 1992). Table 1 below shows the frequencies of the students' linguistic levels from the *Common European Framework of Reference for Languages* (CEFR) (2001) as yielded by the OPT. There were not any statistically significant differences between the individual and collaborative writing groups ($\chi^2(2) = 0.814$, $p = 0.665$). In the collaborative condition, students were paired according to their proficiency level, since collaboration seems to be fostered in similar linguistic ability pairs (Storch, 2018; Villarreal & Gil-Sarratea, 2020).

Table 1. CEFR (2001) linguistic levels per group

Linguistic level (CEFR)	**Group,** *n (%)*	
	Individual writing	**Collaborative writing**
-A1/A1	19 (73.1)	26 (76.5)
A2	5 (19.2)	4 (11.8)
B1	2 (7.7)	4 (11.8)

Writing Task

All the participants completed a decision-making task; specifically, the complex version of the "Fire chief task" (Gilabert, 2007). It includes a visual prompt that depicts a four-storey building on fire where several people are trapped on each floor. The participants had to think and write what sequence of actions they would perform to save as many people as possible. They also had to justify their decisions. As opposed to the simple version, in the complex one different types of people are clearly distinguishable (an elderly man, a pregnant woman with her children, a severely injured person), there is just one fire truck instead of two, there is not any helicopter, the flames are approaching some people and smoke is blowing into the building. Hence, in the complex version of the task, the conditions are more adverse and a higher number of elements has to be considered to resolve the situation successfully, which raises the cognitive demands of the task.

Data Collection Procedure

Intact classes of secondary-school learners participated in the study. Prior to the study, the parents/legal tutors of the secondary-school learners signed the consent form for their participation. There were two sessions of data collection: the participants completed the OPT (Allan, 1992) during the first session and the writing task during the second session. Within the same classes, the participants were randomly assigned to the individual (26 participants) or the collaborative writing condition (17 dyads, that is, 34

participants). After receiving the visual prompt and the instructions for the "Fire-chief" task, both the individual writers and the dyads had 50 minutes to complete the writing task on paper.

Data Analysis

The 43 written texts collected were analyzed for linguistic (lexical and syntactic) complexity, propositional complexity, accuracy, fluency, and communicative adequacy. Lexical complexity comprises the dimensions of diversity (the range of the words used) and sophistication (the proportion of relatively unusual or advanced words) (Read, 2000). D-value (Malvern & Richards, 2002) was calculated to assess lexical diversity (obtained by means of the D_Tools software available at https://www.lognostics.co.uk/tools/D_Tools/D_Tools.htm) (Meara & Miralpeix, 2006). Lexical density was not computed due to the risk of multicollinearity with the other lexical complexity measures (Vasylets, 2017). Following recommendations in Norris and Ortega (2009), we strived to assess syntactic complexity multidimensionally. Thus, we tapped into general syntactic complexity (length of T-unit, which is "one main clause plus whatever subordinate clauses happen to be attached or embedded within it" [Hunt, 1965, p. 765]), coordination (ratio of coordination phrases to the total number of clauses), subordination (ratio of subordinate clauses to the total number of clauses) and nominal complexity (ratio of complex nominals to the total number of clauses). Complex nominals are "(1) nouns plus adjective, possessive, prepositional phrase, adjective clause, participle, or appositive; (2) nominal clauses; and (3) gerunds and infinitives in subject, but not object position (Cooper, 1976)" (Lu, 2011, pp. 44–45). The measures of syntactic complexity and lexical sophistication were obtained by means of the Synlex software (Lu, 2011).

The analysis of propositional complexity was performed manually. Using guidelines from previous research (Vasylets et al., 2020), the texts were segmented into idea units. In these guidelines, an idea unit represents a semantic unit of discourse, which is meaningful and semantically integral. The guidelines define a "meaningful" chunk of discourse as linguistic material which makes sense, cognitively, both to the writer who produces the idea and the reader who interprets it. "Meaningful" ideas typically convey information about an event, state, referent, or location in space or time. "Semantically integral" means that an idea conveys a message which constitutes an undividable block of information. From a syntactic perspective, an idea unit typically (but not exclusively) constitutes a single clause (Vasylets et al., 2020). For instance: "There are people on the roof // but not the old man and the woman // they are inside the building" [3 idea units] (Vasylets, 2017, p. 181). Two measures of propositional complexity were employed: the total number of idea units (the higher the number, the higher degree of propositional complexity, following Bulté & Housen, 2012) and the mean length of idea units (tokens/all idea units).

To assess accuracy, we identified and analysed errors. An error was operationalized as a "linguistic form or combination of forms, which in the same context and under similar conditions of production would not, in all likelihood, be produced by the speaker's native speaker counterparts" (Lennon, 1990, p. 182). The criteria to define an error were set against the criteria of Standard English. We used both an overall/general measure and specific/local measures. As a general measure, we computed the following ratio of errors: (total number of errors/total number of words) x 100 (Chandler, 2003; Evans et al., 2011; Ruiz-Funes, 2015). Concerning specific measures, we used the same ones and with identical coding as in Nicolás-Conesa et al. (2019): we resorted to a broad coding, partially based on Van Beuningen et al. (2012), which distinguished between grammar (syntactic and morphological) and non-grammar errors (lexis and mechanical errors, the latter covering spelling, punctuation, and other minor errors); we also used a narrow coding, partially based on Ferris et al. (2013) and partly data-driven. The ratio of each

specific measure was computed as follows: (total number of errors per specific measure/total number of words) x 100. To identify errors, all the texts were coded independently by two experienced EFL teachers, one of whom was the third author of this study. All the disagreements were discussed until full consensus was reached.

Communicative adequacy was measured as successful task completion in accordance with the instructions and genre requirements of the linguistic task at hand (Kuiken & Vedder, 2017). Communicative adequacy was assessed on a six-point holistic rating rubric, where 6 meant the highest degree of adequacy. Each scale in this rubric contained five sub-dimensions which intended to reflect Grice's (1975) conversational maxims of quantity, relevance, manner, and quality of the message transmission (Vasylets et al., 2020). The first author coded 100% of data for idea units and communicative adequacy, and for inter-rater reliability, 30% of data was coded independently by the three authors. After a preliminary training session, the results were shared in a face-to-face session and all the disagreements of specific cases were solved until full consensus was reached.

Finally, the overall number of words was used as a measure of writing fluency (Wolfe-Quintero et al., 1998). Given that there were very few L1 words in the transcriptions (54, which amounts to 0.79% of the total of the 6,775-word corpus), we did not eliminate these L1 words.

Statistical Analysis

For the statistical analysis, SPSS 23.0 (Statistical Package for Social Sciences) was used. Before performing the main analysis of the data, inter-rater reliability was calculated for the manually counted measures, with Cronbach's Alpha ranging from high (.961 for accuracy and .978 for total number of idea units) to acceptable (.783 for extended ideas and .630 for communicative adequacy) levels. To answer our research question, an independent samples *t*-test was performed.

Results

Table 2 presents descriptive statistics for the dependent measures and the results of the independent samples *t*-test. The results showed that the ratio of all errors was significantly higher for the collaborative texts as compared to individual writing; also, the scores for the complex nominal ratio and coordinate clause ratio were higher in the collaborative condition (all $ps < .05$). The remaining results, which were not significant, revealed the following tendencies: i) an advantage of individual writing for the specific measures of accuracy, syntactic and lexical complexity (except for coordinate clause ratio and complex nominal ratio), fluency and communicative adequacy; ii) an equal pattern in lexical sophistication for both writing conditions.

Discussion

The aim of this research was to explore differences between individual and collaborative L2 writing. To pursue this aim, we compared linguistic and propositional complexity, accuracy, fluency and communicative adequacy of collaborative and individual EFL texts written by L2 secondary-school learners.

According to our results, the scores for coordination and nominal complexity were significantly higher in the collaborative texts. These results point to the potential advantages of collaborative writing for the syntactic complexity of L2 written output, as it shows that while working collaboratively learners

Table 2. Performance comparison between written texts on accuracy, complexity and fluency in individual versus collaborative conditions (independent samples t-test)

Domain	Measure	Collaborative		Individual		*t*
		Mean	*SD*	*Mean*	*SD*	
Accuracy	All errors/100 words	31.02*	13.13	25.07*	6.48	.710
	GE errors/100 words	14.01	7.71	11.27	4.28	.642
	LE errors/100 words	9.76	3.89	8.28	3.40	.550
	ME errors/100 words	6.15	3.35	5.48	2.53	.987
Syntactic complexity	Length of T-unit	16.69	5.79	22.71	16.06	-.725
	Coordinate clause ratio	.28*	.26	.17*	.14	.899
	Subordinate clause ratio	.38	.15	.44	.18	-.421
	Complex nominal ratio	1.08*	.37	.87*	.28	1.20
Lexical complexity	D-value	27.41	8.22	28.72	7.51	-.025
	Lexical sophistication	.17	.05	.17	.05	-.191
Propositional complexity	Idea units	16.29	5.72	21.40	2.74	-.435
Fluency	Number of words	150.6	47.8	169.1	41.7	-1.12
Communicative adequacy		2.76	1.09	2.92	.99	.175

Note: GE = grammatical errors, LE = lexical errors, ME = mechanical errors.
* $p < .05$

are capable of pooling each other's resources constructively and creating a more syntactically complex text. Our results for syntactic complexity contradict some previous research, which has revealed no differences in this dimension (Bueno & Martínez de Lizarrondo, 2017; Fernández-Dobao, 2012; Storch & Wigglesworth, 2007; Villarreal & Gil-Sarratea, 2020; Wigglesworth & Storch, 2009). This could be explained by the type of the task employed or by the differences in the strategic priorities of the learners, who apparently decided to channel their joint effort and linguistic resources into the dimension of syntactic complexity when working collaboratively. These findings seem to be in line with the sociocultural tenets of the benefits of team work and collaboration. Thus, as pointed out by Storch (2013), collaboration may provide an even broader spectrum of learning opportunities. The languaging episodes, during which team members can deliberate about linguistic and semantic aspects of their joint output, triggers "collective scaffolding" (Donato, 1994), that is, they pool on each other's resources, which in this case expanded the possibilities of creating a more complex text.

Another relevant finding was that the participants produced more mistakes overall in the collaborative condition as compared to the individual writing. The results for accuracy can be tentatively explained by the low level of L2 proficiency of the participants. We could suggest that the lack of proficiency might have negatively affected the output of collaborative performance, as the adolescents with gaps in their linguistic knowledge may have pooled each other's errors, with the potential detrimental effects for the joint final output. It is important to note that our results contradict many previous studies which found higher accuracy in collaborative texts (McDonough & García-Fuentes, 2015; Storch, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009). One of the explanations of the discrepancy in findings for accuracy could be the differences in the methodological decisions in terms of the measures of accuracy employed in our study and in previous investigations. While in our work we relied on the

objective measure of accuracy, Wigglesworth and Storch (2009), for example, employed the ratio of error-free units, which is a measure with an acknowledged bias. On the other hand, studies with objective measures of accuracy (e.g., Bueno & Martínez de Lizarrondo, 2017; Fernández-Dobao, 2012) reported an absence of differences between collaborative and individual writing, which further contradicts the results of our study with secondary-school learners.

Finally, we found similar levels of fluency in the collaborative and individual conditions, which is in line with the bulk of previous research (Storch & Wigglesworth, 2007; Villarreal & Gil-Sarratea, 2020; Wigglesworth & Storch, 2009; cf. Bueno & Martínez de Lizarrondo, 2017; Lázaro-Ibarrola & Hidalgo, 2021).

The two conditions exerted parallel (non-significant) effects on lexical complexity (for similar findings, see Lázaro-Ibarrola & Hidalgo, 2021, and Villarreal & Gil-Sarratea, 2020), communicative adequacy and idea units. The explanation for the findings could lie in the nature of the task design employed in this study: our experimental task required a solution for a concrete scenario and involved a number of pre-set characters. Contrary to an open task such as an argumentative essay without any content/pictorial input or the narrative of a personal experience, these characteristics of the task design could predetermine, to a certain extent, the type of vocabulary and the amount of semantic units to produce. Besides, the design of the task could also facilitate a somewhat structured response due to the joint combination of the compulsory reliance on the picture depicting all the elements to take into account plus the clear instructions (justifying the order in which the participants would act in order to save as many people as possible). All such aspects could have entailed the absence of differences between individual and collaborative writing conditions.

CONCLUSION

The aim of this study was to analyse the effect of individual versus collaborative writing on the quality of texts written by EFL secondary-school learners from a multidimensional perspective: accuracy, lexical, syntactical and propositional complexity, fluency and communicative adequacy. To the best of our knowledge, neither lexical sophistication, nor propositional complexity, nor communicative adequacy had been examined before when comparing both writing modalities. The statistically significant findings of this study showed an advantage of collaborative texts primarily revealed in the area of syntactic complexity, while accuracy appeared to be higher in the individually written texts. What emerges from these results is a complex picture of the effects of the individual and collaborative conditions on written performance. Thus, in order to further our understanding of this phenomenon, future studies should take into account the potentially mediating role of learner-related factors, such as the L2 proficiency level, their level of academic/writing experience, their previous knowledge of collaborative work, etc. Indeed, future research could even examine the role of explicitly training students in writing collaboratively (Chen & Hapgood, 2021; Lázaro-Ibarrola & Hidalgo, 2021). Importantly, the effects of different task types and genres (since only one type of task and genre was used in this study) should be analyzed, too.

Our study has several important limitations. Firstly, the data were collected cross-sectionally. A longitudinal design might shed more light on whether the advantages respectively found for the individual and collaborative conditions constitute a standard pattern. Secondly, the number of participants was limited. Thirdly, due to restrictions from the educational centre, it was not possible to record the conversations maintained by the pairs when working collaboratively, which could have provided valuable information

about the focus of their interactions in order to better understand the characteristics of their texts. However, in spite of these limitations, we believe that our study contributed to the knowledge of L2 writing of secondary-school learners, who represent an under-researched population in L2 writing field. To the best of our knowledge, this was the first study which compared collaborative and individual writing at the semantic, linguistic and communicative efficiency levels. Finally, findings from this study also have pedagogical implications as they can inform teachers, even if in a preliminary way, about the particularities of written production under collaborative and individual conditions, which can be instrumental for more efficient implementation of writing activities in an L2 classroom.

ACKNOWLEDGMENT

This chapter is part of the I+D+i Grants PID2019-104353GB-I00, funded by MCIN/AEI /10.13039/501100011033, and 20832/PI/18, funded by Fundación Séneca de la Región de Murcia, Spain. Our sincere thanks also go to the school which allowed us to implement our study, to the students themselves, and the two anonymous reviewers for their valuable comments.

REFERENCES

Allan, D. (1992). *The Oxford Placement Test*. Oxford University Press.

Applebee, A. N. (1984). Writing and reasoning. *Review of Educational Research*, *54*(4), 577–596. doi:10.3102/00346543054004577

Bueno-Alastuey, M. C., & Martínez de Lizarrondo, P. (2017). Collaborative writing in the EFL Secondary Education classroom: Comparing triad, pair and individual work. *Huarte de San Juan. Filología y Didáctica de la Lengua*, *17*, 254–275.

Bueno-Alastuey, M. C., & Rodero Albaiceta, S. (2019). The effects of using collaborative writing vs. peer review treatments on subsequent individual writings. *Huarte de San Juan. Filología y Didáctica de la Lengua*, *19*, 32–61.

Bueno-Alastuey, M. C., Vasseur, R., & Elola, I. (2022). Effects of collaborative writing and peer feedback on Spanish as a foreign language writing performance. *Foreign Language Annals*, *55*(2), 517–539. doi:10.1111/flan.12611

Bulté, B., & Housen, A. (2012). Defining and operationalising L2 complexity. In A. Housen, F. Kuiken, & I. Vedder (Eds.), *Dimensions of L2 performance and proficiency–Investigating complexity, accuracy and fluency in SLA* (pp. 21–46). John Benjamins. doi:10.1075/lllt.32.02bul

Byrnes, H., & Manchón, R. M. (Eds.). (2014). *Task-Based language learning: Insights to and from writing*. John Benjamins. doi:10.1075/tblt.7.01byr

Chandler, J. (2003). The efficacy of various kinds of error feedback for improvement in the accuracy and fluency of L2 student writing. *Journal of Second Language Writing*, *12*(3), 267–296. doi:10.1016/S1060-3743(03)00038-9

Chen, W. (2019). An exploratory study on the role of L2 collaborative writing on learners' subsequent individually composed texts. *The Asia-Pacific Education Researcher*, *28*(6), 563–573. doi:10.100740299-019-00455-3

Chen, W., & Hapgood, S. (2021). Understanding knowledge, participation and learning in L2 collaborative writing: A metacognitive theory perspective. *Language Teaching Research*, *25*(2), 256–281. doi:10.1177/1362168819837560

Council of Europe. (2001). *Common European framework of reference for languages: Learning, teaching, assessment*. Council of Europe. https://rm.coe.int/1680459f97

Donato, R. (1994). Collective scaffolding in second language learning. In J. P. Lantolf & G. Appel (Eds.), *Vygotskian approaches to second language research* (pp. 33–56). Ablex.

Elabdali, R. (2021). Are two heads really better than one? A meta-analysis of the L2 learning benefits of collaborative writing. *Journal of Second Language Writing*, *52*, 100788. doi:10.1016/j.jslw.2020.100788

Ellis, R., & Barkhuizen, G. P. (2005). *Analysing learner language*. Oxford University Press.

Ellis, R., & Yuan, F. (2004). The effects of planning on fluency, complexity, and accuracy in second language narrative writing. *Studies in Second Language Acquisition*, *26*(1), 59–84. doi:10.1017/S0272263104261034

Evans, N. W., Hartshorn, K. J., & Strong-Krause, D. (2011). The efficacy of dynamic written corrective feedback for university-matriculated ESL learners. *System*, *39*(2), 229–239. doi:10.1016/j.system.2011.04.012

Fernández-Dobao, A. (2012). Collaborative writing tasks in the L2 classroom: Comparing group, pair, and individual work. *Journal of Second Language Writing*, *21*(1), 40–58. doi:10.1016/j.jslw.2011.12.002

Ferris, D., Liu, H., Sinha, A., & Senna, M. (2013). Written corrective feedback for individual L2 writers. *Journal of Second Language Writing*, *22*(3), 307–329. doi:10.1016/j.jslw.2012.09.009

Friend, M., & Cook, L. (2014). *Interactions: Collaboration skills for school professionals*. Pearson Education Limited.

Gilabert, R. (2007). Effects of manipulating task complexity on self-repairs during L2 production. *IRAL*, *45*(3), 215–240. doi:10.1515/iral.2007.010

Grice, H. P. (1975). Logic and conversation. In P. Cole & J. Morgan (Eds.), *Studies in syntax and semantics III: Speech acts* (pp. 183–198). Academic Press.

Hidalgo, M. A., & Lázaro-Ibarrola, A. (2020). Task repetition and collaborative writing by EFL children: Beyond CAF measures. *Studies in Second Language Learning and Teaching*, *10*(3), 501–522. doi:10.14746sllt.2020.10.3.5

Hunt, K. W. (1965). *Grammatical structures written at three grade level*. National Council of Teachers of English.

Kuiken, F., & Vedder, I. (2017). Functional adequacy in L2 writing: Towards a new rating scale. *Language Testing*, *34*(3), 321–336. doi:10.1177/0265532216663991

Lantolf, J. P., Thorne, S. L., & Poehner, M. E. (2015). Sociocultural theory and second language development. In B. VanPatten & J. Williams (Eds.), *Theories in Second Language Acquisition* (2nd ed., pp. 207–226). Routledge.

Lázaro-Ibarrola, A., & Hidalgo, M. A. (2021). Give me a second chance: Task repetition and collaborative writing with child EFL learners. *Language Teaching for Young Learners*, *3*(2), 275–299. doi:10.1075/ltyl.20009.laz

Lennon, P. (1990). Investigating fluency in EFL: A quantitative approach. *Language Learning*, *40*(3), 387–417. doi:10.1111/j.1467-1770.1990.tb00669.x

Lu, X. (2011). A corpus-based evaluation of syntactic complexity measures as indices of college-level ESL writers' language development. *TESOL Quarterly*, *45*(1), 36–62. doi:10.5054/tq.2011.240859

Malvern, D., & Richards, B. (2002). Investigating accommodation in language proficiency interviews using a new measure of lexical diversity. *Language Testing*, *19*(1), 85–104. doi:10.1191/0265532202lt221oa

Manchón, R. M. (2013). Learning and teaching writing in the FL classroom: Fostering writing-to-learn approaches. In P. Driscoll, E. Macaro, & A. Swarbrick (Eds.), *Debates in modern language education* (pp. 96–107). Routledge.

McDonough, K., & García-Fuentes, C. G. (2015). The effect of writing task and task conditions on Colombian EFL learners' language use. *TESL Canada Journal*, *32*(2), 67–79. doi:10.18806/tesl.v32i2.1208

Meara, P. M., & Miralpeix, I. (2006). *Y_Lex*. Lognostics.

Nicolás-Conesa, F., Manchón, R. M., & Cerezo, L. (2019). The effect of unfocused direct and indirect written corrective feedback on rewritten texts and new texts: Looking into feedback for accuracy and feedback for acquisition. *Modern Language Journal*, *103*(4), 848–873. doi:10.1111/modl.12592

Nokes-Malach, T. J., Meade, M. L., & Morrow, D. G. (2012). The effect of expertise on collaborative problem solving. *Thinking & Reasoning*, *18*(1), 32–58. doi:10.1080/13546783.2011.642206

Norris, J., & Ortega, L. (2009). Towards an organic approach to investigating CAF in instructed SLA: The case of complexity. *Applied Linguistics*, *30*(4), 555–578. doi:10.1093/applin/amp044

Pallotti, G. (2009). CAF: Defining, refining and differentiating constructs. *Applied Linguistics*, *30*(4), 590–560. doi:10.1093/applin/amp045

Read, J. (2000). *Assessing vocabulary*. Cambridge University Press. doi:10.1017/CBO9780511732942

Ruiz-Funes, M. (2015). Exploring the potential of second/foreign language writing for language learning: The effects of task factors and learner variables. *Journal of Second Language Writing*, *28*, 1–19. doi:10.1016/j.jslw.2015.02.001

Skehan, P., & Foster, P. (2007). Complexity, accuracy, fluency and lexis in task-based performance: A meta-analysis of the Ealing Research. In S. Van Daele, A. Housen, F. Kuiken, M. Pierrard, & I. Vedder (Eds.), *Complexity, accuracy and fluency in second language use, learning and teaching* (pp. 207–226). Contactforum.

Storch, N. (2005). Collaborative writing: Product, process, and students' reflections. *Journal of Second Language Writing*, *14*(3), 153–173. doi:10.1016/j.jslw.2005.05.002

Storch, N. (2011). Collaborative writing in L2 contexts: Processes, outcomes, and future directions. *Annual Review of Applied Linguistics*, *31*, 275–288. doi:10.1017/S0267190511000079

Storch, N. (2013). *Collaborative writing in L2 classrooms*. Multilingual Matters. doi:10.21832/9781847699954

Storch, N. (2018). Collaborative language learning. In C. A. Chapelle (Ed.), *The Encyclopedia of Applied Linguistics*. doi:10.1002/9781405198431.wbeal0153.pub2

Storch, N., & Wigglesworth, G. (2007). Writing tasks: The effects of collaboration. In M. P. García-Mayo (Ed.), *Investigating tasks in formal language learning* (pp. 157–177). Multilingual Matters.

Swain, M. (2005). The output hypothesis: Theory and research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 471–483). Lawrence Erlbaum.

Swain, M. (2006). Languaging, agency and collaboration in advanced second language proficiency. In H. Byrnes (Ed.), *Advanced language learning: The contribution of Halliday and Vygotsky* (pp. 95–108). Continuum.

Tynjälä, P., Mason, L., & Lonka, K. (2001). Writing as a learning tool: an introduction. In P. Tynjälä, L. Mason, & K. Lonka (Eds.), *Writing as a learning tool. Integrating theory and practice* (pp. 7–22). Kluwer Academic Publishers. doi:10.1007/978-94-010-0740-5_2

Van Beuningen, C., De Jong, N., & Kuiken, F. (2012). Evidence on the effectiveness of comprehensive error correction in second language writing. *Language Learning*, *62*(1), 1–41. doi:10.1111/j.1467-9922.2011.00674.x

Vasylets, O. (2017). *Task-modality effects: A study of task complexity effects in speech and writing*. [Doctoral dissertation, University of Barcelona]. Digital repository of the University of Barcelona. http://hdl.handle.net/2445/113218

Vasylets, O., Gilabert, R., & Manchón, R. M. (2017). The effects of mode and task complexity on second language production. *Language Learning*, *67*(2), 394–430. doi:10.1111/lang.12228

Vasylets, O., Gilabert, R., & Manchón, R. M. (2019). Differential contribution of oral and written modes to lexical, syntactic and propositional complexity in L2 performance in instructed contexts. *Instructed Second Language Acquisition*, *3*(2), 87–108. doi:10.1558/isla.38289

Vasylets, O., Gilabert, R., & Manchón, R. M. (2020). Task complexity and task modality: CAF measures and communicative adequacy. In R. M. Manchón (Ed.), *Writing and language learning. Advancing research agendas* (pp. 183–206). John Benjamins. doi:10.1075/lllt.56.08vas

Villarreal, I., & Gil-Sarratea, N. (2020). The effect of collaborative writing in an EFL secondary setting. *Language Teaching Research*, *24*(6), 874–897. doi:10.1177/1362168819829017

Vygotsky, L. S. (1978). *Socio-cultural theory*. Harvard University Press.

Wigglesworth, G., & Storch, N. (2009). Pair versus individual writing: Effects on fluency, complexity and accuracy. *Language Testing*, *26*(3), 445–466. doi:10.1177/0265532209104670

Wolfe-Quintero, K., Inagaki, S., & Kim, H. Y. (1998). *Second language development in writing: Measures of fluency, accuracy, & complexity*. University of Hawai'i, Second Language Teaching & Curriculum Center.

Wood, D. J., & Gray, B. (1991). Toward a comprehensive theory of collaboration. *The Journal of Applied Behavioral Science*, *27*(2), 139–162. doi:10.1177/0021886391272001

Zhang, M., & Plonsky, L. (2020). Collaborative writing in face-to-face settings: A substantive and methodological review. *Journal of Second Language Writing*, *49*, 100753. doi:10.1016/j.jslw.2020.100753