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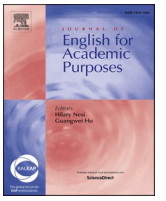

The role of theory in structuring literature reviews in qualitative and quantitative research articles

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Structuring an introduction and literature review (henceforth literature review) for an empirical study in a way that justifies the study, while summarizing prior related research, is a complex and important skill for scholars. Thus, it is not surprising that a great deal of research on academic writing has focused on the literature review. While some research has focused on specific fields (e.g., Khaw & Tan, 2018; Kuteeva & McGrath, 2015), much research has been comparative. Studies of literature reviews may detail how they differ in structure across fields (e.g., Lim, 2010) or languages (e.g., Loi, 2010). In addition, some research has focused on writers' development in producing the genre (e.g., Chen & Li, 2019). Other research has taken a lexical approach by focusing on lexical bundles or phrase-frames in literature reviews (e.g., Lu et al., 2018), and some focused on more global issues, such as citation use (e.g., Hu & Wang, 2014). Often, studies of linguistic features also include an analysis of rhetorical moves. For example, Cortes (2013) quantified lexical bundles according to which rhetorical moves they appeared in, and Lu et al. (2021) described the relationship between syntactic complexity and rhetorical moves. Such an approach has been advocated by Moreno and Swales (2018), who note that these types of analyses bridge the form-function gap.

The dominant model for describing rhetorical moves in literature reviews has been the *Create a Research Space* or CARS model (Swales, 1990, 2004) associated with what has been called the *English for specific purposes* approach to genre analysis. The affordance of this text-based approach is that it allows for the coding of large data sets to use in quantitative analyses. Our current comparative study also uses the CARS model, in conjunction with a lexical analysis, in a unique way, namely to illustrate how theories are used in quantitative versus qualitative applied linguistics research. We review here three topics: (1) characterizations of the role of theory in quantitative and qualitative research; (2) corpus-based studies of quantitative and qualitative research; and (3) recent applications of the CARS model in empirical studies. In bringing together these areas, we discuss why a closer examination of literature reviews is needed with regard to the role of theory in justifying research across paradigms.

1. Literature review

1.1. Characterizations of theory in quantitative and qualitative research

The role of theory in empirical research is not a new topic, yet its relevance and importance continue to be discussed. Recently, organizational psychologists Aguinis and Cronin (2022) claimed that "the number one and most important reason why research is

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meaningful and makes a useful and valuable contribution is theory" (p. 1). They characterized theory as "essentially just a fancy word for 'Do we understand what's going on?'" (p. 2). Despite the importance of theory, Aguinis and Cronin noted that there are times when theories may not be needed. In second language acquisition (SLA), VanPatten et al. (2020) described theories as statements that explain the *why* of natural phenomena. VanPatten et al. also acknowledge that not everyone believes that SLA research needs to be theory driven, and we agree that there is no consensus on the role of theory in research on language learning and teaching. Conversely, Aguinis and Cronin (2022) claimed that in organizational psychology, a study that does not contribute to theory is unlikely to be published. Given that Gao et al. (2022) found that in articles published between 2013 and 2019 in top applied linguistics journals, 38% of quantitative studies and 23% of qualitative studies did not mention theory, this characterization of the role of theory may not be true across academic fields.

Regarding paradigmatic differences, scholars have addressed the role of theory to some extent, for example, in relation to forming research questions. A recent attempt by Creswell and Creswell (2018) explained, citing Kerlinger (1979), that theories are used in quantitative research to test hypotheses and examine the relationship among variables. In qualitative research, theories are used as a broad explanation for behaviors and attitudes and as a lens that "shapes the types of questions asked, informs how data are collected and analyzed, and provides a call for action or change." (p. 108).

Within applied linguistics, claims have been made of paradigmatic differences. They differ, however, in nature and have changed over the years. For example, some researchers have claimed that unlike quantitative research, qualitative research can generate hypotheses without being rooted in theory (Brown, 2014; van Lier, 1994), yet Davies (1995) holds an opposing view. Others have lamented that quantitative research is not rooted strongly enough in theory (Gregg, 1989, 1993; Long, 2007). Meanwhile, several scholars from both paradigms have proclaimed the necessity of theory including VanPatten et al. (2020) and Collins and Stockton (2018), for quantitative and qualitative research, respectively. It seems, then, that calls for attention to theory have increased, but as reported in Gao et al. (2022), they have been only partially heeded.

The aforementioned characterizations are not inappropriate, but we know of very little research on the role of theory that has taken a discursive approach by examining published studies to illustrate the framing of research. Because paradigmatic discussions of how quantitative and qualitative research differ abound in research methods books, we believe that it is important to verify such claims through an empirical investigation.

1.2. Corpus-based studies of quantitative and qualitative research

Despite a large amount of comparative research on research articles, surprisingly, less research has been devoted to variation across research paradigms, specifically quantitative versus qualitative research. Although none of these studies, apart from Gao et al. (2022), discussed the role of theories, research has illustrated that corpus-based approaches reveal how language expresses epistemological differences in the two approaches.

Candarli and Jones (2019) examined lexical bundles across the two research paradigms in the field of education. With regard to the function of the bundles, the three types they identified were all more common in quantitative research: referential (e.g., *are presented in table*), stance (e.g., *it could be argued*), and discourse organizers (e.g., *on the other hand*). In addition, Candarli and Jones were able to identify bundles that were more distinctive in each type of research. For example, *was found to be* was more distinctive in quantitative research while *to make sense of* was more distinctive in qualitative research. Through this corpus-based analysis, they were able to draw conclusions about the nature of the two paradigms as expressed through the language used in research articles.

Similarly, Cao and Hu (2014) examined interactional metadiscourse expressions in the discussion sections of articles in three fields. They found several types of interactional metadiscourse that were more common in quantitative research, while none were more common in qualitative research. They concluded that this was because the expressions (e.g., *in other words*, *in the next section*) helped show causality and links among variables, noting that there was less need in qualitative research to use such comparative transitions. As compared with qualitative studies, both Cao and Hu (2014) and Candarli and Jones (2019) suggest that quantitative research draws on more formulaic language, suggesting, perhaps, that the structure of research in this paradigm is more uniform across studies.

Using a multi-dimensional analysis, Gray (2013) examined research articles for differences across fields and paradigms. This approach, established by Biber (1988) and colleagues, considers how linguistic and lexical features group together to form different compositional dimensions. Gray was able to show how quantitative and qualitative research articles differed across several dimensions. For example, for applied linguistics articles, qualitative articles were more narrative and human-focused while quantitative articles were more procedural and non-human focused. This is not surprising, but Gray showed how these characterizations were expressed through linguistic forms.

Focusing on the role of theories, Gao et al. (2022) were interested in how theories played a role in quantitative and qualitative applied linguistics research. Gao et al. (2022) analyzed how frequently the lemma *theor-* was used and how it collocated with other lexical items. They found that *theor-* was used more often in qualitative studies. Furthermore, collocations revealed that theories in quantitative research were often hypothetical in nature and meant to be tested and confirmed whereas in qualitative research, theories were used as heuristics that guided research. Gao et al. (2022) were motivated by characterizations of quantitative and qualitative inquiry that appeared in various research methods books, presumably not based on empirical evidence. Their findings did not delve into how theory (as represented by the lemma *theor-*) was used in relation to the various rhetorical moves found in literature reviews, the focus of this study.

1.3. Recent applications of the CARS model

There are different versions of the CARS model (Swales, 1990, 2004; Swales & Feak, 2012), but most studies draw on Swales (2004), also used in our study. The CARS model posits that scholars use three basic rhetorical moves to frame literature reviews: establishing a territory, establishing a niche, and presenting the present work (Swales, 2004). The first move is self-contained and is made to both establish relevance and synthesize previous research. The latter two contain substeps that first identify gaps in research and then state how the study will resolve these gaps. Swales's model is presented in Table 1 with examples from the current study. Although the universality and certain methodological issues have been debated (e.g., Kuteeva & McGrath, 2015 and Polio & Friedman, 2017, respectively), the model's use as a heuristic remains steady. We cannot summarize all research here, but instead, focus on a few studies whose application of the model is somewhat related to our use of the CARS model.

Similar to our study, Kwan et al. (2012) examined literature reviews in two research paradigms in the field of information systems, namely, behavioral science research and design science research. Their research question specifically concerned the paradigmatic differences in how previous research is evaluated. Thus, they identified specific strategies (not normally included as steps in the CARS model) within the three main moves that related to evaluating previous work. While there are not clear parallels in the two paradigms from information systems to the quantitative-qualitative divide, Kwan et al. showed that the two paradigms used different strategies within the three main moves.

Le and Harrington (2015) examined the moves in the discussion sections of quantitative applied linguistics articles, an understudied section of research articles as compared to literature reviews, as they note. They explained that in discussion sections, "the researcher presents to the reader the meaning of the quantitative findings and shows how their study contributes to *theory* and practice in the discipline" (emphasis added, p. 46). They identified key words (i.e., words distinct to the discussion section) as well as clusters (i.e., lexical bundles) and related them to the specific steps from the discussion sections. Interestingly, despite their claim that the discussion sections were used to advance theory, *theor-* was not found in any of the key words or lexical bundles. This lack of *theor-* use

Table 1
CARS Model from Swales (2004) with Examples Containing *theor-*.

Move/ Step	Function	Example
1	Establishing a territory (via topic generalizations of increasing specificity)	I will briefly summarize the main *theoretical* pillars of the study, namely self-determination *theory* and the concept of intrinsic motivation (Deci & Ryan, 1985), and self-efficacy *theory* (Bandura, 1997), and elaborate on the link between student motivation and feedback. (Busse, 2013; *JSLW*, p. 408, Qual)
2a	Establishing a niche: Indicating a gap	Surprisingly, given the recent promotion by *theorists* of an interactive approach over instruction that focuses on strategies, no research has compared the two methods. (Yeldham, 2016; *TQ*, p. 399, Quan)
2b	Establishing a niche: Adding to what is known	Herein lies the role that TBLT could play in compensating for the *theoretical* concerns of SFL theory. (Yasuda, 2017; *TQ*, p. 580, Qual)
2c	Establishing a niche: Presenting positive justification	FSB has attracted many researchers in different branches of psychology (for a meta-analysis, see Anseel et al., 2015) but has not been investigated in the field of SLA. This is surprising considering CF has long been a central area of *theoretical* and empirical interest to SLA researchers. (Papi, 2019; *MLJ*, p. 206, Quan)
3a	Presenting the present work: Announcing the present research descriptively and/or purposively	To better understand identity as an activity, the study draws upon Activity *Theory* (Engestrom, 1987; Leontiev, 1981), which underscores the role socio-historical-cultural settings play in understanding human actions and behavior, and highlights the situated and goal-directed nature of human learning. (Lee, 2013; *JSLW*, p. 331, Qual)
3b	Presenting the present work: Presenting research questions or hypotheses	Built on a thorough review by Sugita McEown, Noels, and Chaffee (2014), it hypothesizes that integrating *theories* allows for the identification of more factors holistically and reveals that conceptually overlapping self- and identity-related orientations predict different variables. (McEown et al., 2017; *MLJ*, p. 533, Quan)
3c	Presenting the present work: Clarifying definitions	Having defined interactional difficulty from a *theoretical* point of view, its operational definition can be based on the following 'validity argument' (Kane, 2013), which may apply to other sources of difficulty as well. (Pallotti, 2019; *AL*, p. 183, Quan)
3d	Presenting the present work: Summarizing, clarifying, or justifying the choice of the framework	This *theoretical* stance on language teacher identities informs my understanding of Sela's experiences and identity shifts over time, enabled by the approach I advocate for the analysis of short stories. (Barkhuizen, 2016; *TQ*, p. 659, Qual)
3e	Presenting the present work: Announcing principal outcomes	Moreover, findings show how the introduction of translanguaging pedagogy in participating schools disrupted dominant monolingual approaches in *theoretical* as well as practical ways, and the impact of doing so on educators and students. (Menken et al., 2019; *TQ*, p. 743, Qual)
3f	Presenting the present work: Stating the value of the present research	Investigating synchronous (immediate) CF is of both *theoretical* importance for Second Language Acquisition (SLA) and of practical importance for language pedagogy. (Shintani, 2016; *MLJ*, p. 297, Quan)
3g	Presenting the present work: Outlining the structure of the paper	To establish this theoretical argument, I first articulate the contributions that a Vygotskian sociocultural *theoretical* perspective offers to our understanding of teacher learning within the context of teacher education. (Johnson, 2015; *MLJ*, p. 516, Qual).

Note. Uses of *theor-* from our data are italicized throughout.

suggests that theory may more likely be addressed in literature reviews (of quantitative applied linguistics articles) than in discussion sections.

Lu et al. (2020) examined the relationship between syntactically complex sentences and rhetorical functions, but before doing so, they modified Swales's (2004) model to include additional steps found in the literature reviews of some fields. Of particular relevance to our study, Lu et al. added a step to move 3 called "advancing theoretical claims," noting, in another study, "[In] some disciplines (e.g., economics and political science), it was fairly common for an RA [research article] to propose a new theory or model as its main objective and to elaborate on the main claims or hypotheses of that theory or model in the introduction …" (Lu et al., 2021, p. 66). Using pre-identified measures of complexity and two types of analyses, they found that sentences in this move (among others) contained more finite dependent clauses and reached a set threshold level of nominalizations. Lu et al. (2021) also examined social science literature reviews from several fields by first coding the rhetorical moves and then determining the phrase-frames that were used to express the rhetorical functions. However, the term *theor-* was not found in any of the phrase-frames including those found in "advancing theoretical claims." Although we did not use this model in our analysis, we return to it in other sections of this paper.

As a whole, the aforementioned studies illustrate how rhetorical moves are expressed through lexical bundles and phrase-frames, keywords, and syntactic complexity, thus bridging what Moreno and Swales (2018) called the *form-function gap*. Taking the above research together, we believe that a rhetorical moves approach provides a useful framework for our analysis of how researchers refer to theories in situating and justifying research in literature reviews.

2. Focus of current study

This study compares the literature reviews of quantitative and qualitative empirical articles in applied linguistics, or more specifically, studies on second language learning and teaching. While we acknowledge the narrow focus on our own field, we also believe that the balance of both research traditions makes applied linguistics an ideal field for which to compare quantitative and qualitative literature reviews. In addition, many journals in the field publish both types of research, so we can, to some extent, keep the publication venues constant. Our research question is: How is the lemma *theor-* used in the rhetorical moves of literature reviews in quantitative and qualitative studies on second language learning and teaching?

By starting with the lemma *theor-* and identifying the rhetorical moves in the literature reviews, we are using what Lu et al. (2021) and others call a *form-first* approach. In this approach, for example, one begins by identifying a word, bundle, or structure and identifying the associated moves (e.g., Cortes, 2013). Conversely, one can identify the moves and then determine the associated language (e.g., Lu et al., 2021). Given our research question, a form-first approach was appropriate because we wanted to identify which moves invoked theory.

3. Method

3.1. Corpus compilation and data preparation

The current study is part of a larger corpus-based project on the genre analysis of published quantitative and qualitative research on second language learning and teaching (Gao et al., 2022). In the first of this multiple-article study, we selected four top-tier journals that published empirical studies on L2 learning and teaching as the source of our corpus: *Applied Linguistics* [*AL*], *Journal of Second Language Writing* [*JSLW*], *Modern Language Journal* [*MLJ*], and *TESOL Quarterly* [*TQ*]. We set the scope of the article search for 2013–2019 with articles from 2020 added for this current study.

Our rationale for corpus criteria was as follows. First, we limited our article search to the leading journals because we believe the leading journals represent exemplary language use, regardless of author background. A second, important criterion was whether the journals published quantitative and qualitative research in a relatively balanced manner, because we needed to ensure our findings about the impact of research type were not confounded by the publication preferences of journals. For example, we did not include *Studies in Second Language Acquisition* or *Language Learning* because quantitative studies represented 90% and 100% of the empirical studies published in these journals in 2019, respectively. In the end, the journals we selected represented four out of the top 12 journals in linguistics at the time of data collection. (See S1 in the supplemental materials.)

Third, we set the starting point of our article search at 2013 because this period was marked by increasing methodological awareness in the field of L2 learning and teaching. The increasing awareness is reflected by (1) the compilation of multiple special issues on methodology by leading journals (e.g., *Applied Linguistics*, *Language Learning*, and *TESOL Quarterly*), (2) the updating of guidelines for journal submission (e.g., Mahboob et al., 2016; Norris et al., 2015), (3) the publishing of numerous handbooks of research methods, methodological meta-analyses, and research syntheses (e.g., Brown, 2014; Phakiti et al., 2018; Plonsky, 2014, 2015), and (4) the regular hosting of conference colloquia and pre-conference workshops dedicated to methodological discussions (e.g., Hulstijn et al., 2014). Of course, methodology was discussed prior to 2013, but we believed that research trends would be more likely revealed in an era of more systematic discussion.

After identifying all the full-length articles published by the four leading journals between 2013 and 2020, two of the researchers read through the articles independently to exclude the non-empirical studies. Specifically, we defined empirical articles as those characterized by systematic collection and analysis of data, while excluding all articles that did not present new data, including position papers and descriptions of personal experience and educational policy. We also excluded all research syntheses except for meta-analyses, which were kept as examples of quantitative research.

We then removed the empirical studies without an explicit focus on second language learning or teaching, such as those on

language policy. We coded the remaining articles according to their methodologies (quantitative, qualitative, or mixed-methods) following the practices and definitions in Creswell (2013), Gollin-Kies (2014), and Henning (1986). Specifically, we coded quantitative studies as those predominantly involving the "tallying, manipulation, or systematic aggregation of quantities of data" (Henning, 1986, p. 702), while categorizing qualitative studies as those predominantly consisting of text analysis, ethnography and case studies, narrative accounts, verbal reports, and conversation analysis. Regarding corpus-based studies and discourse analyses, we followed Gollin-Kies's (2014) practice by coding those that were numerically based as quantitative, while coding the rest qualitative. Lastly, we followed Creswell's (2013) definition in categorizing mixed-methods studies as those in which the investigator "collects and analyzes data, integrates the findings, and draws inferences using both quantitative and qualitative approaches or methods in a single study or program of inquiry" (p. 4). All the ambiguous cases were coded *other*. To ensure inter-rater reliability, the researchers first coded the studies independently and then compared their results. The initial inter-rater agreement was 89.86 per cent. Problematic cases were discussed in team meetings until all three researchers reached 100 per cent agreement. At the end of this step, all the mixed-methods and ambiguous cases were removed. Table 2 summarizes the procedure and Table 3 provides the final number of articles used in our analysis.

After the articles were selected and classified, the researchers cleaned the data. Only the introduction and the literature review sections were extracted on the grounds that we aimed to explore the functional role of theories in creating a research space (Swales, 1990, 2004) in quantitative and qualitative L2 research. We did not, for example, extract the methods sections, not because theories played a lesser role there, but because methods sections focus on the studies *per se* and thus are less relevant to our research objective. For subsequent data analysis, all the files were automatically converted into plain text files and all the paragraph headings, graphs, tables, and figures were removed. The data cleaning resulted in a 1,561,252-token corpus with two subcorpora (qualitative: 659,577 tokens; quantitative: 901,675 tokens).

3.2. Data analysis

To compare the functions of theories in quantitative and qualitative L2 research, we coded the rhetorical functions of all the sentences containing the 1904 uses of *theor-* found in the corpus.[1] This included 1030 uses from 237 qualitative studies (77% of the qualitative studies) and 874 uses from 222 quantitative studies (61% of the quantitative studies). They were coded according to Swales's (2004) revised CARS model. The sentences were examined in context, and any sentence containing more than one use of *theor-* was counted more than once. In addition, because this current study, as opposed to Gao et al. (2022), examined every use of *theor-* and not only the collocations of the most used forms, we were able to make additional observations. For example, we noted any negative uses of *theor-* that may suggest a study is atheoretical, and examined the verb form, *theorize*, which appeared too infrequently for a collocational analysis in Gao et al. (2022).

We developed coding guidelines based on a random sample of the first batch of data (2013–2019) and used the same guidelines to code the remaining data in the first and the later batch (from 2020). The specific procedures were as follows. We extracted 1641 *theor-* concordances (qualitative: 867; quantitative: 777) from our first batch of data using AntConc (Anthony, 2019), and then randomly extracted 20% of the concordances as pilot data (qualitative: 175; quantitative: 154). Second, two of the researchers coded the pilot data based on Swales's (2004) revised CARS model. Ambiguous cases were discussed at team meetings until all three team members reached 100% agreement on the coding results. At the end of this step, we formulated coding guidelines with specifications and examples (see S2 in the supplemental materials). Finally, two researchers coded the remaining *theor-* concordances. The overall inter-rater agreement was 81.64 per cent (1285 out of 1574 sentences). Disagreements were discussed at team meetings until there was 100 percent agreement, with one ambiguous sentence removed from the final data set. Examples of each of the functions are provided in Table 1.

We did not use Lu et al.'s (2020) model because we were concerned that the increased number of steps would have resulted in steps that were too infrequent to analyze, but after the quantitative analysis, we re-examined all of the sentences in move 3 to determine if any might fall under the new step, *advancing theoretical claims*, since such a step is important to the focus of this study. Two of the researchers read through all the Move-3 segments and independently identified those that proposed a new theory or model or elaborated on the main claims or hypotheses of the theory or model in the introduction. Ambiguous cases were discussed in team meetings until agreement was reached. Because this analysis was exploratory, we did not analyze the findings quantitatively.

After the coding was completed, we performed multilevel multinomial logistic modeling on the functional coding (i.e., the moves and steps) of the 1903 uses of *theor-*. This method provides a robust analysis of nested, discrete choice data (Griffiths et al., 2002) and was therefore appropriate for our corpus where *theor-* uses were nested consecutively in the articles, journals, and by authors (i.e., the same article could contain multiple instances of *theor-*, the same journal could publish multiple articles, and the same author could contribute to multiple journals). We included the functional coding of each use of *theor-* as the outcome, with Move 1 as the baseline

[1] We also checked for similar words such as *hypothesis, approach, model, and framework*. The count of the 667 articles that used these words instead of *theor-* was respectively: 31 (hypothesis), 115 (*approach*), 83 (*model*), and 59 (framework). Compared with the use of *theor-* (452/667), these words were less prevalent. Furthermore, the actual percentage of articles that used these similar words in the theoretical sense is lower, as a considerable number of the occurrences of these words were in atheoretical contexts, for example, *model texts*, *model of instruction*, *pedagogical model, pedagogical approach, approach to teaching, methodological approach*, and the *Common European Framework of Reference for Languages*. Furthermore, *theory* is arguably a more agreed-on term than, for example, *approach*. Or at least, there has been more of an attempt to define it within the field (e.g., VanPatten et al., 2020).

Table 2
Procedures of corpus compilation.

Step	Procedure	No. of Articles
1	Identification and Downloading of Full-Length Articles from the Four Leading Journals, 2013–2020	974
2	Removal of Non-Empirical Articles and Research Syntheses	842
3	Removal of Articles Not Focused on L2 Learning	766
4	Removal of Mixed-methods Articles and Ambiguous Cases	667

Table 3
Breakdown of 667 articles by journal and research type.

	No. of Quan Studies	No. of Qual Studies	Sum
AL	91	49	140
JSLW	59	64	123
MLJ	63	106	169
TQ	148	87	235
Total	361	306	667

category. That is, we estimated the odds of using *theor-* for all the other moves and steps relative to those of using *theor-* for Move 1. Research Type was the only fixed effect (i.e., the parameter we aimed to consider), with the Quantitative as the baseline. To determine the random effects (i.e., those variables that may have had an effect but that could not be systematically examined), such as Author, we followed a series of model-building strategies which are specified in the results section. Goodness of fit of the models was assessed based on negative 2 log likelihood (-2LL) tests using the Chi-squared statistics (McIntosh, 2012). We also considered the variance accounted for by the random effect to determine the null model.

In our corpus, 69.28% of the qualitative studies (212 out of 306) used *theor-* 717 times to *establish a territory* (Move 1), while 54.57% of the quantitative studies (197 out of 361) used *theor-* 670 times for the same purpose. Because Move 1 was set as the baseline and hence was not examined in the multilevel multinomial logistic modeling analysis, we conducted an additional mixed-effects logistic regression analysis on the Move 1 data, to explore whether quantitative and qualitative research differed in using theory to establish the territory. For the response variable, we coded each study binarily as either using or not using *theor-* for Move 1. Research Type was the only fixed effect, with the logarithms of the length of the articles as the offset (as *theor-* is more likely to occur in longer articles). To determine which random effects to include in the null model, we followed similar model-building procedures as in the multilevel multinomial logistic modeling analysis. In the end, none of the random-effects models converged. As a result, we conducted a logistic regression using the *glm* function of the *stats* package v. 4.1.0 (R core team, 2021). Model fit was assessed with -2LL tests using the Chi-squared statistics (McIntosh, 2012).

4. Findings

Table 4 gives an overview of the occurrence of *theor-* in the two corpora. These are the same results presented in Gao et al. (2022) but with data from 2020 added. It shows that *theor-* continues to be used more often in qualitative research than in quantitative.

Before addressing the main research questions, we first examined the 1903 uses to *theor-* to determine if any were used to dismiss or question the role of theory. Because we found only six examples from four qualitative authors, we kept them in the analysis. In addition, it seemed significant that *theory* was mentioned because 31.18% of articles in the corpora did not use the lemma at all. Four of the six negative examples were written by three authors who worked within a conversational analysis framework, as shown in examples (1) and (2), to justify the atheoretical nature of the approach.

Table 4
Descriptive Statistics of *theor-* Sentences in Quantitative and Qualitative Subcorpora.

	No. of Articles		% of Articles Containing *theor-*		Normalized Frequency of *theor-* (per 1000)			
					Quan		Qual	
	Quan	Qual	Quan	Qual	*Mean (SD)*	*95% CI*	*Mean (SD)*	*95% CI*
2013	42	44	66.67	75.00	1.23 (1.62)	[0.72, 1.73]	1.06 (1.09)	[0.73, 1.39]
2014	41	32	39.02	62.50	0.55 (1.13)	[0.19, 0.90]	1.30 (1.72)	[0.68, 1.92]
2015	47	33	68.09	75.76	0.84 (0.88)	[0.58, 1.10]	1.82 (2.47)	[0.94, 2.69]
2016	51	25	70.59	88.00	1.23 (1.62)	[0.77, 1.68]	1.85 (1.98)	[1.03, 2.66]
2017	47	33	65.96	90.91	1.34 (2.12)	[0.72, 1.96]	2.07 (1.86)	[1.41, 2.73]
2018	33	51	51.52	66.67	0.85 (1.40)	[0.35, 1.34]	1.42 (2.38)	[0.75, 2.09]
2019	55	43	65.45[a]	86.05	0.76 (0.96)	[0.50, 1.02]	1.87 (2.41)	[1.13, 2.62]
2020	45	45	57.78	80.00	0.78(1.22)	[0.42, 1.15]	1.44(1.84)	[0.89, 2.00]
Total	361	306	61.50	77.45	0.95(1.43)	[0.81, 1.10]	1.57(2.02)	[1.34, 1.80]

[a] This figure was erroneously reported as 67.67 in Gao et al. (2022). The analysis was not affected.

(1) The reason is that, adopting an ethnomethodologically oriented CA-SLA perspective on learning, I take an agnostic stance toward *theoretical* constructs related to learning, and in particular toward cognitivist constructs. (Hauser, 2017; *MLJ*, p. 714, Qual)
(2) With such an approach, which is agnostic toward any exogenous *theory* of learning, it is possible to describe the displays of socially distributed cognition that participants make available to each other (and thus to analysts) in and through talk-in-interaction. (Kunitz, 2018; *MLJ*, p. 66, Qual)

The descriptive statistics for all 1903 uses of *theor-* are shown in Table 5, which gives the percentage of each move/step out of the total number of *theor-* uses. In other words, it shows how the authors used *theor-* in their studies. The move- and step-specific data is represented visually in Figs. 1 and 2, respectively. Note that although the statistical analyses can account for the effects of individual authors (e.g., one author's excessive use of *theor-*), the figures provide only an overview and cannot account for the idiosyncrasies of specific authors.

From the statistics and visualizations, two observations can be made. First, both bodies of research (particularly quantitative research) used *theor-* sentences primarily to *establish a territory* (i.e., Move 1), that is, to review the literature in the field to provide a research context. Second, qualitative studies appeared to use *theor-* to fulfill certain moves (namely, to present the present work) and specifically certain functions (e.g., 3a and 3d) more frequently than quantitative studies, suggesting that theories are an especially important heuristic for qualitative research to justify its significance.

To compare the use of theories in the two research paradigms, we performed two rounds of multilevel multinomial logistic modeling, first on the coding of moves and second on the step-specific coding of the *theor-* segments in the quantitative and qualitative research articles, with Research Type as the fixed effect. As Move 1 was used most frequently by both bodies of research, we selected it as the baseline for both rounds of analyses.

When modeling the move-based coding of the *theor-* uses, we followed a series of model-building strategies to determine which random effects to include in the null model. Details of this process can be found in S3 in the supplemental materials. At the end of the process, we included in our null model by-article random intercepts and random slopes for Journal by Research Type as the random effects.

We then entered the only fixed effect, Research Type, into the null model. The results are shown in Table 6. The inclusion of Research Type significantly improved our null model, χ^2 (2) = 19.78, $p < .001$.

From Table 6, we may draw the following observations. First, the qualitative and quantitative studies represented in our corpus assigned *theor-* to different rhetorical moves, as reflected by the significant improvement of model fit after the addition of the fixed effect (i.e., Research Type). In other words, qualitative researchers were, with Move 1 as the baseline, 2.21 times more likely than their quantitative counterparts to use *theor-* for Move 3, namely, to present their own work. Second, the articles exhibited considerable variability (variance: 0.19; 95% CI: (0.03, 1.12)) and the Journals also exhibited small-scale variability across the two types of research they published (variance: 0.05; 95% CI: (0.01, 0.30)).

In the analysis on the step-specific data, we followed the same model-building strategies as in the first round, the specifics of which

Table 5
Frequency and Percentages of Specific Steps Containing *theor-* per Sentences.

Move	Step	Function	Quant (%)	Qual (%)
1		Establishing a Territory	670/874 (76.66)	717/1029 (69.68)
2		Establishing a Niche	79/874 (9.04)	51/1029 (5.93)
	2a	Gap-Indicating	31/874 (3.55)	25/1029 (2.43)
	2b	Adding to What Is Known	31/874 (3.55)	28/1029 (2.72)
	2c	Providing Justification	17/874 (1.95)	9/1029 (0.87)
3		Presenting the Present Work	125/874 (14.30)	251/1029 (24.39)
	3a	Announcing the Present Research Descriptively and/or Purposively	50/874 (5.72)	95/1029 (9.23)
	3b	Presenting RQs or Hypotheses	6/874 (0.69)	3/1029 (0.29)
	3c	Clarifying Definitions	3/874 (0.34)	12/1029 (1.17)
	3d	Summarizing, Clarifying, and Justifying Method/Framework	15/874 (1.72)	71/1029 (6.90)
	3e	Announcing Principal Outcomes	0/874 (0.00)	1/1029 (0.10)
	3f	Stating the Value of the Present Research	19/874 (2.17)	24/1029 (2.33)
	3g	Outlining the Structure of the Paper	32/874 (3.66)	44/1029 (4.28)

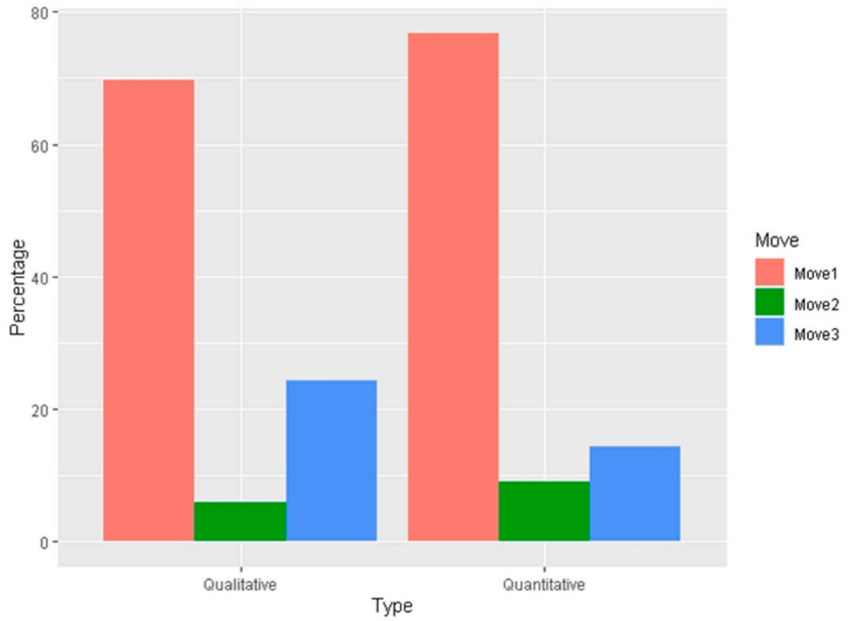

Fig. 1. Percentages of *theor*- Sentences for Different Moves across Quantitative and Qualitative Subcorpora, 2013–2020

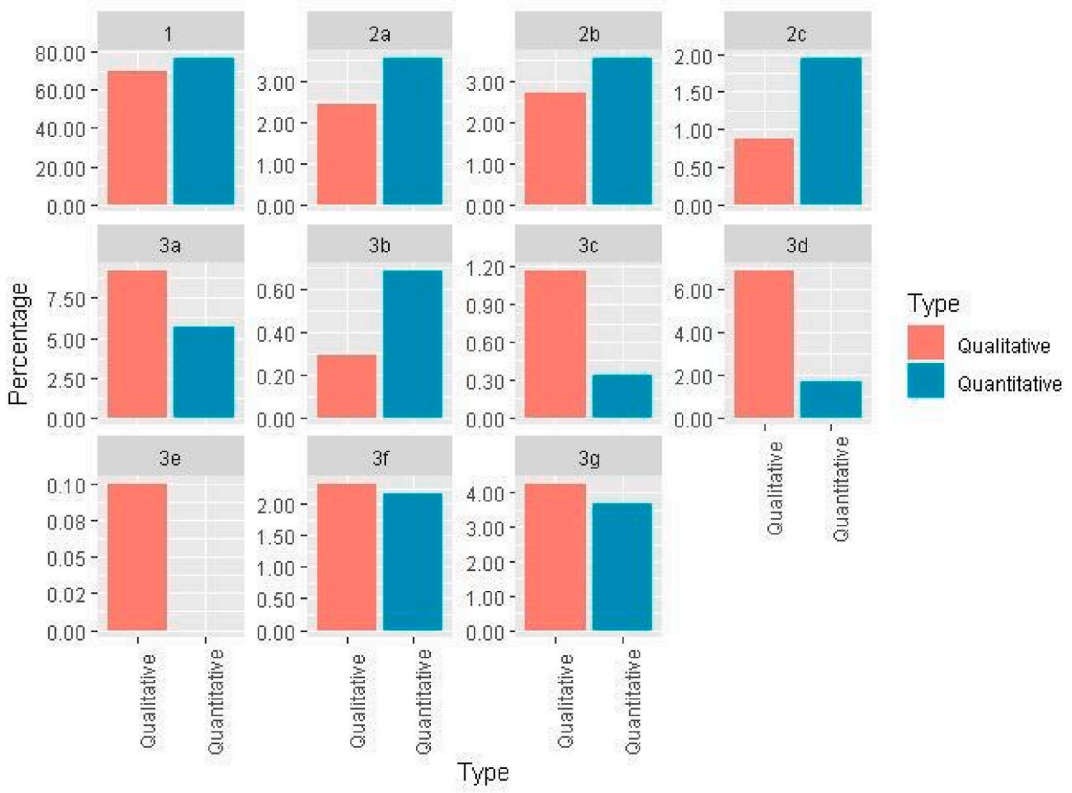

Fig. 2. Percentages of *theor*- Sentences for Specific Steps across Quantitative and Qualitative Subcorpora, 2013–2020*
Note. Because of the low frequency of some steps, the y-axes were set individually, so that each scale fit the values shown in each panel.

Table 6
Model summary (Baseline level: Move 1).

Coding	*Coef*	*SE*	*Z*	*p*>|*z*|	*95% CI*	*Odds Ratio (95% CI)*
Move 1 as Baseline Type (Quantitative as Baseline)						
Move 2						
Type	- 0.21	0.22	−0.97	.332	(-0.65, 0.22)	0.81(0.52, 1.25)
[Article]	1 (constrained)					
[Type#Journal]	1 (constrained)					
Move 3						
Type	0.79	0.20	3.98	**< .001**	(0.40, 1.18)	2.21 (1.50, 3.27)
[Article]	2.61	1.16	2.25	**.024**	(0.34, 4.88)	
[Type#Journal]	0.37	0.30	1.25	.210	(-0.21, 0.95)	
Random Effects						
Intercept: Article	0.19	0.17			(0.03, 1.12)	
Slope: Journal	0.05	0.04			(0.01, 0.30)	
Model Fit:						
-2LL (8) = −1354.56						
$\chi^2(2) = 19.78$ ($p < .001$)						
$N = 1903$		AIC: 2725.13 BIC: 2769.54				

are reported in S3 in the Supplemental Materials. At the end of the process, we included by-Journal random intercepts as the only random effect in our null model on the step-specific data.

In the following step, we included Research Type in the model, leading to a significant improvement, -2LL $\chi^2(10) = 56.58, p < .001$. Table 7 summarizes the model.

Table 7 presents estimates of the odds of qualitative studies using *theor-* for each functional step as compared with those for quantitative studies, with the odds for both types of studies to use *theor-* for Move 1 as the baseline or comparison point. From Table 7, the following observations can be made. First, the inclusion of research type significantly improved the model fit. Second, in our

Table 7
Model summary (Baseline level: Move 1).

Coding	*Coef*	*SE*	*Z*	*p*>|*z*|	*95% CI*	*Odds Ratio (95% CI)*
Move 1 as Baseline						
Move 2a						
Type	−0.31	0.29	−1.08	.282	(-0.87, 0.25)	0.73 (0.42, 1.29)
[Journal]	1 (Constrained)					
Move 2b						
Type	−0.16	0.28	−0.57	.567	(-0.70, 0.38)	0.85 (0.50, 1.47)
[journal]	0.94	0.41	2.29	.022	(0.14, 1.74)	
Move 2c						
Type	−0.70	0.42	−1.69	.091	(-1.52, 0.11)	0.49 (0.22, 1.12)
[journal]	−0.04	0.44	−0.08	.932	(-0.90, 0.83)	
Move 3a						
Type	0.57	0.18	3.12	**.002**	(0.21, 0.93)	1.77 (1.24, 2.54)
[journal]	0.19	0.21	0.90	.367	(-0.22, 0.60)	
Move 3b						
Type	−0.76	0.71	−1.07	.283	(-2.15, 0.63)	0.47 (0.12, 1.88)
[journal]	0.02	0.75	0.03	.976	(-1.46, 1.50)	
Move 3c						
Type	1.41	0.64	2.19	**.029**	(0.15, 2.67)	4.09 (1.16, 14.45)
[journal]	−0.39	0.63	−0.61	.542	(-1.63, 0.86)	
Move 3d						
Type	1.49	0.29	5.07	**< .001**	(0.91, 2.06)	4.43 (2.49, 7.88)
[journal]	0.65	0.34	1.92	.054	(-0.01, 1.30)	
Move 3e						
Type	15.43	2298.28	0.01	.995	(-4489.12, 4519.98)	5038404.39 (0, ∞)
[journal]	−0.65	2.85	−0.23	.820	(-6.23, 4.93)	
Move 3f						
Type	0.17	0.32	0.54	.587	(-0.45, 0.79)	1.19 (0.64, 2.21)
[journal]	0.78	0.54	1.43	.152	(-0.29, 1.84)	
Move 3g						
Type	0.25	0.24	1.04	.300	(-0.23, 0.73)	1.29 (0.80, 2.08)
[journal]	0.61	0.32	1.94	.052	(-0.01, 1.23)	
Random Effects						
Journal	0.21	0.20			(0.03, 1.33)	
-2LL (30) = −2087.88						
$\chi^2(10) = 56.58$, $p < .001$						
$N = 1903$			AIC: 4235.77		BIC: 4402.30	

corpus, the quantitative and qualitative articles used theories to realize different rhetorical steps. With Move 1 (establishing the territory) as the baseline, the qualitative studies used *theor-* more frequently than the quantitative counterparts to announce three substeps: (3a) present research descriptively and/or purposively, (3c) offer definitional clarifications, and (3d) summarize, clarify, or justify the method or framework chosen. The results show, with Move 1 as the baseline, that qualitative studies were, compared with their quantitative counterparts, 1.77 (95% CI: (1.24, 2.54)) times more likely to use *theor-* to announce the research content or purpose (3a), 4.09 (95% CI: (1.16, 14.45)) times more likely to use *theor-* to explain key terms, and 4.43 (95% CI: (2.49, 7.88)) times more likely to use *theor-* to summarize, clarify or justify the method or framework chosen. Finally, the variation between journals accounted for considerable variability in the results (variance: 0.21, 95% CI: (0.03, 1.33)).

For illustration, the following examples of the segments realizing the 3a, 3c, and 3d steps are extracted from the qualitative subcorpus in examples (3)–(5).

(3) Step 3a (Announcing the Present Research Descriptively and/or Purposively):
Using the *theoretical* framework of language socialization (Ochs & Schieffelin, 2012), this paper investigates … (Friedman, 2019; *JSLW*, p. 24, Qual)
(4) Step 3c (Clarifying Definitions):
Using Activity *Theory*, teachers' identity is viewed as a mediated activity that involves humans using tools … (Lee, 2013; *JSLW*, p. 331, Qual)
(5) Step 3d (Summarizing, Clarification, and Justifying Method or Framework):
This article, therefore, explores INoP as a means of representing and *theorizing* the forms of social support that mediate learning for (English) language learners … (Zappa-Hollman, 2015; *TQ*, p. 334, Qual)

As Move 1 was set up as the baseline in the multilevel multinomial regression and hence remained unexamined, we conducted a logistic regression analysis on whether the two bodies of research differed in their use of *theor-* for Move 1. To reduce the risks of Type I errors resulting from repeated testing, we performed the analysis on the entire data set rather than on the studies that used *theor-*. The results showed that the qualitative studies used *theor-* more frequently for Move 1 than the quantitative studies, with Research Type improving the fit of the null model, $\chi^2(1) = 23.58$, $p < .001$. Thus, the qualitative studies were 2.21 times more likely to use *theor-* for Move 1 than the quantitative studies (95% CI: [1.60, 3.06]). Note that although qualitative studies used *theor-* in Move 1 more often than quantitative studies, the subset of quantitative studies that used *theor-* were more likely to use it in Move 1 compared to other moves (cf. the percentage of *theor-* for Move 1 compared with that for Moves 2 and 3 within quantitative and qualitative research in Fig. 2).

Finally, as a separate analysis, we considered Lu et al.'s (2020) step from Move 3, *advancing theoretical claims,* which they added to the CARS model. While we did not incorporate the step into our quantitative analysis, we conducted a separate exploratory analysis by considering the possible candidates for this step in the corpus (which had been coded variously as other steps). Because this part of the study was exploratory, two researchers reviewed the coded moves and identified 40 sentences that could potentially have been coded as *advancing theoretical claims*. After discussion among the three researchers we agreed that only 8 sentences from the qualitative studies and 3 from the quantitative studies were candidates for this step as in examples (6) and (7), respectively.

(6) My data call for a fuller materialization, embodiment, and performativity in *theorizing* language competence than currently conceptualized in applied linguistics. (Canagarajah, 2018; *MLJ*, p. 269, Qual)
(7) *Theoretically*, it will present a new construct, task interactional difficulty, and will discuss ways of operationalizing it that rely on socio-interactionist notions such as turn-taking and participation dynamics, rather than on the cognitive-interactionists constructs that have been prevailing in previous SLA research on tasks. (Pallotti, 2019; *AL*, p. 177, Quan)

One unexpected finding was that among the 40 sentences singled out for evaluation was that 13 of the 40, about a third, included a form of the verb *theorize*. *Theorize* as a form of *theor-* was not analyzed for collocations in Gao et al. (2022) because of its lower frequency than other forms. Sentences using the verb form in these 40 sentences were exclusively from qualitative studies. Examples (8) and (9) illustrate this phenomenon.

(8) Drawing on an interdisciplinary body of scholarship on translation … this study complicates current understanding of translation as a cognitive phenomenon by *theorizing* translation as distributed, mediated, embodied, and negotiated. (Wang, 2020; *JSLW*, p. 2, Qual)
(9) Though making bilingualism central to standards-based reform is necessary for all students, in this article we challenge dominant, monolingual approaches by *theorizing* a standards-based reform initiative that focuses specifically on emergent bilingual students. (Flores & Schissel, 2014; *TQ*, p. 455, Qual)

Because of this finding, we investigated the verb form *theor-*, a form not included in Gao et al. (2022) because of its relatively lower frequency. We found that it was used a total of 122 times, 88 times by 46 qualitative authors and 34 times by 27 quantitative authors, and in Move 3, it was used 30 times by qualitative authors and 2 times by quantitative authors, thus showing a clear trend toward use of the verb form in qualitative research. We return to this point in the discussion section.

5. Discussion and conclusion

In Gao et al. (2022), we noted that *theory* was not mentioned at all in 38% of quantitative articles and 23% of qualitative articles on second language learning and teaching and that it was mentioned significantly more often in qualitative research. By looking at the collocations with *theor-*, we concluded that quantitative studies maintained an epistemic objectivity when invoking the theories because theories were something to be tested and validated. Conversely, qualitative studies retained a more heuristic relation with theories, that is, theories were guideposts or lenses through which to view phenomena. While this is not surprising, we were able to link specific language to each of these views of theory in our corpus of research articles.

By adding data from 2020 to the analysis from Gao et al. (2022) and considering the rhetorical moves, we came to additional conclusions about the discourse used in relation to theory. First, we confirmed the trend that theory (as realized by *theor-*) continues to be more often invoked in qualitative research. In years 2013–2019, 62% of quantitative articles and 77% of qualitative articles used *theor-*, and in 2020 the distribution was 58% versus 80%. In contrast with earlier lamentations over the insufficient role of theory in the field (e.g., Long, 2007), our analysis revealed theory as a key, but not required, resource in the creation of a research space for current mainstream applied linguistic research, perhaps more so for research adopting a qualitative paradigm. Second, although within qualitative research the significance assigned to theory varies from approach to approach (Creswell & Poth, 2018), our analysis found theory to be more essential to qualitative as compared with quantitative research in questions of legitimacy and authority, as reflected by qualitative researchers' (overall) heavier reliance on theory for justifications of research significance.

Second, we compared the role of theory from a discursive-functional approach. Our analysis revealed that while the research adopting the two methodologies relies on theory primarily to establish the territory (Move 1), the use of *theor-* for this move was more common in qualitative research. However, note that when quantitative researchers used *theor-*, they used it more frequently in Move 1 than with other moves. In addition, qualitative researchers drew on theory more frequently when presenting the present work (Move 3); more specifically, they are more likely to invoke theory to state the research content or purpose (Step 3a), clarify key definitions (Step 3c), and summarize, clarify, or justify the method or framework chosen (Step 3d). It seems then that with regard to the role of theory in rhetorical moves, both bodies of research (qualitative research in particular) use theory to set the stage, so to speak. By establishing the territory with theory, researchers show how their research can be connected to previous work. Furthermore, qualitative researchers also return to theory in the literature review to describe or justify the research. What may be more significant is that qualitative researchers often use theory to define terms. In comparison, quantitative researchers often define terms by operationalizing constructs in the methods section, explaining, for example, how a variable is measured.

Finally, we considered the step put forth by Lu et al. (2021), *advancing theoretical claims.* Although we did not confirm that this was a necessary step to include in future versions of the CARS model (Swales, 1990, 2004), we found that when examining possible cases of this move, the verb form, *theorize*, or its nominalization, *theorization*, occurred often and was used exclusively in qualitative research in this potential move. Future research on the verb form, *theorize*, in other disciplines (e.g., education or psychology) can help provide a more comprehensive understanding of the rhetorical function of this particular verb form of *theory*, especially in qualitative research.

Regarding instructing novice researchers in applied linguistics or researchers trying to understand different research paradigms, it is important to note that these findings are *trends* and not rules for how to write up a quantitative or qualitative study. They provide a way to look more closely at one aspect of academic research, namely, how theories are used to position and present research. We stated earlier that our narrow focus on language learning research may be a limitation of this study, but at the same time, we, in our position as researchers trained in a more quantitative tradition, were able to discover patterns about qualitative research that were new to us. Specifically, we discovered that conversational analysts eschew theory and that qualitative researchers use the verb form of *theory* in a way that we do not fully understand. If we can discover features of academic language and the structure of academic articles in our own field (through a corpus-based analysis), novices will have even more to discover. On one hand, researchers in applied linguistics have arguably become more siloed and may not consider how other paradigms write or use theory to justify research. On the other hand, with more attention on mixed methods research, understanding how the other half writes is important if we are to bridge the quantitative-qualitative gap. Furthermore, anyone teaching a general research methods class needs to understand the role of theory across paradigms.

In terms of teaching academic writing to students in other fields, we can only help draw their attention to how theories are used in their fields and not instruct them on how to do it. Hands-on data-driven learning activities in advanced EAP classes could be used where students search for forms of *theor-* and compare their uses across fields or paradigms. We can also encourage student discussions with their advisors on the topic. On a related note, we feel that our next step needs to be to interview researchers from different paradigms to better understand their views on the role of theory and how those views were and continue to be (re)constructed. We also want to delve into their thoughts on the necessity of framing a study with a focus on theory and to hear their advice to novice researchers on the topic. Although our study examined only introductions and literature reviews, students and future researchers should also focus on the discussion section to better understand how authors return to theories. In sum, as three researchers at different stages in our careers, a corpus-based analysis of *theor-* across two subcorpora of studies on language learning and teaching enabled us to make observations about the structuring of literature reviews that had not been accessible to us by simply reading research in different paradigms. Thus, we feel that narrowly focused corpus-based studies of published research, moving beyond lexical bundles, for example, can provide insights to all.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jeap.2023.101243.

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