

The Expression of Stance in Research Articles: A Semantic Study of Verbal Predication in Infinitival Nominal Clauses

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Abstract:

This paper examines the use of infinitival nominal clauses in academic discourse by focusing particularly on their accompanying verbal heads – typically termed “controlling predicates” – and how they function in standardized research articles (RAs). Drawing on the evaluative potential of these linguistic devices, this study attempts to highlight the differences and similarities between the soft and hard domains of scientific knowledge in expressing stance. To this aim, a sample of 25 RAs equally taken from the disciplines of medicine and social psychology is analyzed and compared to depict the writers’ general tendency in employing verbal predicates of nominal to-infinitives and detect any variation in their semantic choices. The qualitative and quantitative analyses have revealed that there is an unequal distribution of the verbal predicates used before nominal to-clauses in both sub-corpora in favor of interpersonally-loaded heads such as communicative, cognition and probability verbs. The latter are proved to help the writers communicate different types of stance in line with the requirements of academic writing as well as their corresponding disciplinary venues. Indeed, the analysis equally showed that, though little, variation across disciplines exists and it can be traced at the level of the quality and quantity of predicates belonging to the same semantic domain.

Keywords: academic; research articles; infinitival nominal clauses; verbal predicates; stance.

Date of Submission: 15-06-2021

Date of Acceptance: 30-06-2021

I. Introduction

The prestigious position that the RA genre occupies within the realm of academic writing has lured researchers from varied affiliations to conduct extensive studies in the aim of depicting its characterizing rhetorical as well as linguistic features (Gledhill, 1995; Holmes, 1997; Adams & Quintana-Toledo, 2013). Recent research endeavors in that direction have concluded that stance-taking in academic interactions is a factual practice and their long-established impersonality is but a myth (Swales, 2004; Hyland, 2004; Breeze, 2009; Lorés-Sanz et al., 2010). There has been accordingly a “growing awareness of the critical importance of interpersonal aspects in academic communication”, which led to intensifying the focus on the linguistic devices used to construct this rhetorical feature of interpersonal (Lorés-Sanz et al., 2010, p. 1). Particularly, the literature has taken great interest in investigating multiple word-level resources, laying special attention to interpersonal metadiscourse as one “important pragmatic resource for influencing readers’ responses to claims” in the writings of academics (Hyland 2004, p. 110). The construal of argument in academic genres has, therefore, been proved to be carried out mostly through a bundle of different metadiscursive tools such as hedges and boosters (Hyland, 2004; Behnam et al., 2012), personal pronouns (Aull & Lancaster, 2014) and attitude markers (Hyland, 2008).

Contrary to the abundance of studies which feature one-word interpersonal devices, there has been a dearth of research works that attempted to explore higher clause-level stance markers in RAs. In fact, as noted by Lafuente-Millán et al. (2010, p. 17), delimiting the interpretation of stance-taking within the boundaries of metadiscourse entails the risk of “restricting the scope of analysis to explicit lexico-grammatical features, even though it is acknowledged that authors can manoeuvre interpersonally by means of clausal elements”. The literature, indeed, affirms those raised concerns as the evaluative potential of clausal elements in construing academic knowledge seems to have escaped the lenses of researchers and discourse analysts (Tse & Hyland, 2010). The few studies (Tse & Hyland, 2010; Devenci & Nunn, 2018) that attempted to fill this gap have scrutinized the finite clausal agnates, such as relative clauses, at a time when it has been confirmed that modern RAs display “a tendency towards a non-finite mode of expression” (Malá, 2010, p. 80).

Among the non-finite clausal structures that have been reported to figure predominantly in RAs are nominal clauses (Kozáčíková, 2015). Although the latter are described by grammarians as carriers of stance by virtue of construing “an attitudinal or evaluative frame for some other proposition” (Biber et al., 1999, p. 966),

they are treated in the bulk of research on academic writings as mere economical tools that particularly fit the compactness of RAs (Granger, 1997; Nováková, 2008; Rafajlovičová, 2008; Kozáčíková, 2015). In this regard, a noteworthy study by Kozáčíková (2015, p. 60) highlighted the “tendency for stance in connection with to-infinitive clauses” in RAs. Yet, the study showcases differences between native and non-native writers within the same discipline of Linguistics while variation across disciplines remains under-explored.

Building on Kozáčíková’s (2015) conclusions and aspiring to cover the aforementioned gaps, this paper seeks to bring to the fore the different uses of nominal infinitival clauses which are hypothesized to function interpersonally to relay the authors’ stance in both sampled scientific disciplines. Additionally, this study attempts to detect any disciplinary variation that can be traced in the semantic types of controlling verbal predicates chosen by medical and social psychology authors.

II. Literature Review

2.1. Nominal Infinitival Clauses as Stance Markers

Compared to participles, Dykes (2007) posits that the to-infinitive is “the most common and recognizable form of non-finite verb[s]” (p. 42). What makes infinitives gain a global probability of occurrence across different English registers is their liability not only to realize multiple meanings through different forms but also to serve a wide range of syntactic roles (Brinton, 2000; Biber et al., 2002; Quirk et al. 2005). Semantically speaking, infinitive clauses can evoke both simultaneous and anterior situations in relation to the main clause. Their frequent uses, however, relate to potentiality as they tend to express an action that “looks forward” and so its realization is merely probable rather than factual (Downing & Locke 2006, p. 109). Added to this semantic versatility, Quirk et al. (2005) note the syntactic flexibility of infinitival clauses to function as subjects, extraposed subjects, complements of subjects, direct objects, complements of objects, adverbials, noun complements, adjectival complements and postmodifiers. This syntactic richness results in three distinct functional types of infinitival clauses: relative, adverbial and nominal.

What characterizes nominal to-clauses compared to the other two functional categories is their liability to attach to different types of heads conveying a variety of meanings. They are, thus, alternatively termed “complement clauses” as they work to “complete the meaning relationship of an associated [noun], verb or adjective” (Biber et al., 1999, p. 658). More than just preceding to-clauses, the nominal, adjectival and verbal heads control the content of the accompanying complement clause and so they are referred to as ‘controlling predicates’ (Biber et. al, 2002). These predicates offer multiple semantic choices and so their use engenders distinct communicative functions. Of relevance to this study is the function pertaining to stance, which is typical of verb and adjective predicates rather than nominal heads. As posited by Biber et al. (1999), nominal clauses controlled by adjectival and verbal predicates are one of the prime linguistic tools used to “express personal feelings, attitudes, value judgments, or assessments” (p. 966). Compared to adjectives, though, the verbal agnates are more productive, which warrants the focus on them in this study. The productivity of nominal to-clauses preceded by verbs is rendered to the wide repertoire of semantic domains these verbs can express, which allows for varied functions and nuanced degrees of stance. Indeed, not only do infinitival nominal clauses with controlling verbs “report speech and mental states, [but] they are also used to report intentions, desires, efforts, perceptions, and other general actions” (Biber et al., 2002, p. 328). In this regard, Biber et al. (2002, p. 332) identify 9 major meanings corresponding to the functions that verbal predicates of complement clauses can express as summarized in Table 1.

Table 1: Semantic domains of verbal predicates controlling infinitival nominal clauses

Semantic domain	Examples of verbal predicates
1. speech act/communication	ask, claim, offer, promise, request, say, command, advise, prove, show, convince, teach
2. cognition	expect, assume, believe, consider, know, suppose, find, estimate
3. perception	hear, tell, see, watch, feel
4. desire	like, need, wish, want, hope, desire, love, prefer, regret
5. intention/decision	decide, agree, intend, mean, prepare, aim, choose, resolve
6. effort	attempt, try, fail, seek, strive, struggle
7. modality/causation	allow, require, help, authorize, encourage,
8. aspectual	begin, start, continue
9. existence/occurrence	seem, tend, appear, happen

Considering that “the semantics of the matrix predicate has a strong influence on the shape of a complementation configuration” (Lohninger & Wurmbrand, 2020, p. 15), this study aims to spot the most common types of predicates employed in the selected RAs and analyze their uses in relation to stance. Based on Biber et al.’s (2002) classification, it will be checked whether similar or different choices of verb types are made by the writers of each discipline based on the requirements that each camp of knowledge might impose as explained further in the next section.

2.2. Disciplinary Variation of Stance in Hard and Soft Sciences

Since the scope of this study is comparative in nature, two different disciplines corresponding to the hard and soft domains of knowledge are chosen to be analyzed. It is therefore essential to review the features that characterize each scientific camp to lay the theoretical basis for the interpretation of the findings in a later stage.

Originally, monolithic and uniform representations of disciplines have been discarded based essentially on the nature of the scientific knowledge they disseminate (Hyland, 2004). Accordingly, disciplines which typically emphasize cumulative, quantitative, empirical, explanatory, analytical, systematic and universal knowledge fall under the ‘Hard’ paradigm of sciences. On the other hand, if the disciplinary area is interested in particulars, qualities and interpretation, thus resulting in reiterative and synthetic knowledge, it is categorized as ‘Soft’ (Becher, 1994; Hyland, 2005b).

It follows from this cognitively-based classification of sciences that academic writers develop different conceptions of how knowledge should be construed depending on the shared values, cultures, practices, methods and assumptions of the disciplinary communities they operate within (Hyland, 2004; Tessuto, 2012; Swarat, Oliver, Tran, Childers, Tiwari & Babcock, 2017). This way, academic interactions within disciplinary boundaries are increasingly viewed as part of a social practice or enterprise which shapes and conditions “how” they are written rather than merely “what” they write about (Hyland, 2004, p. 3). In other words, added to the content or subject matter of academic texts, the societal and cultural norms of each discipline leave their imprints at the level of the linguistic features and rhetorical strategies that these texts carry (Hyland, 2005b; North, 2005; Tessuto, 2012).

Studies which investigated these features for the sake of detecting disciplinary variation have spotted one crucial difference related to the expression of stance (Swales, 1990; Swales, 2004; Hyland, 2004; Yang, 2014). In fact, it has been noticed that authors from hard and soft disciplines display “different ways of engaging with readers” (Hyland, 2004, p. 3). Swales (2004), for instance, reported how, compared to the hard sciences, the authors of social psychology papers – affiliated in the soft paradigm of science – tend to employ more thematic clausal justifications in their Methods section as a persuasive tool to thwart anticipated criticisms. In the same vein, Hyland (2005b, p. 96) found out that the humanities and social science articles are more explicit in their persuasive choices than the hard ones as they use “far more, more varied, and more argumentative, reporting verbs”. In another study, Vázquez and Giner (2008) confirmed how the use of interpersonal rhetorical devices is conditioned by “specific constraints or conventions of different disciplines” (p. 178). Indeed, after analyzing 12 RAs belonging to the soft-hard continuum of knowledge, they concluded that the soft science of Marketing includes more hedging elements than the hard discipline of Biology. One more study by Abdi (2002) analyzed and compared 55 RAs from the social and natural sciences. The results indicated significant variations in the frequency and use of interpersonal metadiscourse by writers in both sciences, reaffirming the tendency of soft disciplines to intervene more to “express their subjective stance towards the information being presented” (p. 143). It should be noted, at this point, that irrespective of these reported disciplinary differences, Hyland (2004, p. 30) suggests that the distinction between the soft-hard domains is not always clear-cut and accordingly proposes a continuum of disciplines that replaces the “unidimensional scales”.

Compared to these previous studies, in this paper, it will be checked if the reported disciplinary variation in relation to stance-taking can also be observed in the corpus under analysis through the use of nominal infinitival clauses. It is also interesting to see whether the sampled sciences belong to the extreme ends of the Hylandian disciplinary cline or represent atypical variants of the soft-hard domains that share more similarities than differences.

III. Corpus and Methods

This study analyzes a corpus of 25 scientific RAs compiled from 10 distinct international journals. For comparative purposes, the collected articles are equally divided into two sub-corpora, each representing a different camp of scientific knowledge. The first sub-corpus is sampled from the hard discipline of Medicine (M) and it counts 50.421 words. It is taken from 5 different online journals, namely *the British Medical Journal*, *the Canadian Medical Association Journal*, *the Journal of the American Medical Association*, *the Journal of the American Board of Family Medicine* and *Plos Medicine*. Three articles are selected from each journal resulting in a total of 15 articles. The second sub-corpus contains 10 articles, each two are extracted from one of

following e-journals: *the Journal of Applied Social Psychology*, *Current Research in Social Psychology*, *the Journal of Research in Personality*, *Personality and Individual Differences* and *the Journal of Vocational Behavior*. To ensure a valid comparison, an attempt is made to equalize the number of words so that it is closer to the sub-corpus of medicine. The social psychology sub-corpus (SP) is thus made up of 50.475 words. Combined, the RAs sampled from both disciplines make up a corpus of 100.896 words.

To handle this corpus, a variety of mixed methods from qualitative and quantitative research is adopted. Quantitatively, in order to obtain numerical data in relation to the most frequent uses of nominal to-clauses, this study resorts to frequency distribution. This will allow classifying data according to high and low scales and ultimately observing any kind of variation or any ‘trend’ that keeps emerging from the statistics (Manikandan, 2016). Before that, the corpus is treated manually to extract all instances of nominal infinitival clauses and categorize them according to the semantic types of their verbal predicates (see Table 1). To validate the observed frequencies and generalize their occurrence, another quantitative tool is used which is the Chi-Square significance test. This statistical test “measures the association between two categorical variables” and can therefore be useful to confirm or infirm any differences between the studied disciplines (Ugoni & Walker, 1995, p. 61). Chi-square test calculations are carried out automatically relying on Preacher’s (2001) tool.

Because the ultimate aim of the researcher is to “attempt to understand a specific organizational reality” and account for its meaningful occurrence (Jonker & Pennink, 2010, p. 77), the qualitative method is also adopted in this study to support the statistical analyses. Precisely, the observed frequencies will be interpreted by analyzing one by one examples from the commonly distributed patterns of nominal clauses with infinitival verbal predicates in both disciplines and seeing how they function in their context.

IV. Results And Discussion

The analysis carried out in what comes follows two steps; the first of which deals with the overall frequency of nominal to-infinitives in the sampled corpus, while the second specifically focuses on the investigation of the predicates that accompany these constructions.

4.1. Frequency of Nominal Infinitival Clauses

Before analyzing the different uses of nominal to-clauses in the selected corpora, it is essential to check their statistical distribution in the whole corpus and across disciplines. For comparative ends, all types of infinitival clauses are counted. The obtained frequencies gathered after manual annotation are displayed in Table 2.

Table 2: Overall Frequency of infinitival clauses per type

	Medical articles		Social psychology articles		TOTAL	
	Nb	%	Nb	%	Nb	%
Nominal	258	55%	420	66%	684	62%
Adverbial	197	41%	189	30%	381	34%
Adjectival	18	4%	27	4%	45	4%

Compared to other infinitival types, it is obvious that nominal clauses are considerably predominant not only in the whole corpus of RAs but also across disciplines. Indeed, as Table 2 shows, more than half of the employed to-clauses have a nominal function while adverbial clauses constitute around one third of all extracted instances of to-infinitives, and clausal adjectives are sparingly deployed by the authors. This apparent imbalance in the distribution of the different infinitival types of clauses in favor of the nominal agnates can be rendered to the functional potential of the latter. As already pointed to in section (2), apart from their obligatory presence to sustain the transition of the message, nominal infinitival clauses provide a favorable arena to “fully assess and evaluate the status of the data obtained”, which is not typical of adverbial or adjectival clauses (Kozáčiková, 2015, p. 62). These excerpts from the selected corpus illustrate this interpersonal function.

- (1) M33: risk does **not appear** to be evenly distributed across ethnic groups (**nominal**)
- (2) SP115: This instrument **has been shown** to be a well-validated and reliable measure of global self-regard (**nominal**)
- (3) M3: We used kit dependent parameters to calculate quantitative results (**adverbial**)
- (4) M1: the time to decrease below the threshold of the protective amount of antibodies can be estimated (**adjectival**)

Contrary to examples (3) and (4) which serve to clarify and provide more details about the methods adopted in carrying out the experiments, the nominal clauses in (1) and (2) carry out the authors’ evaluation of the reported results. This interpersonal function could be transmitted via the predicates that precede the

infinitives which allow the writers to not only invest stance but also vary the degree of commitment to the proposition.

While this finding reinforces what has been established in the literature about the statistical predominance of nominal clauses in academic written registers (Biber et al., 1999) and their particular abundance in RAs such as Linguistics (Kozáčiková, 2015), it does not say much about the little variation that Table 2 displays in relation to disciplines. In fact, to explain how and why social psychology papers make more use of nominal clauses, a deeper level of analysis needs to be carried out in relation to the preferred predication types in both sub-corpora.

4.2. Analysis of Predication in Nominal Infinitival Clauses

As one common form of stance-taking in the analyzed RAs, the different predicates that precede to-infinitives with a nominal function are sorted out according to their types in the aim of checking which heads are the most favored by the authors in both disciplines.

4.2.1. Distribution of predication in nominal to-clauses

After classifying all instances of infinitival nominal clauses in the corpus, the frequency distribution results show that they are controlled by the three different types of predicates, namely verbal, nominal and adjectival, but with varying percentages as stated in Table 3.

Table 3: Predicate types of nominal clauses in both sub-corpora

	Medical	Social psychology	Total
Verbal predicates	136 (55%)	237 (60%)	373 (58%)
Adjectival predicates	75 (30%)	92 (23%)	167 (26%)
Nominal predicates	35 (14%)	68 (17%)	103 (16%)

According to Table 3, both medical science and social psychology papers contain more nominal clauses with verbal heads (58%) which remarkably override the total number of infinitives headed by nouns and adjectives even when combined (42%). What is equally notable is that although nominal clauses controlled by adjectival predicates lag behind verbal ones, they supersede the adverbial variants which are the least common type used by the authors in both disciplines. This disproportion in the distribution of predication signals the primacy of the evaluative ends while employing nominal to-clauses in the analyzed corpus. Indeed, considering how complement clauses headed by nouns “do not typically present a personal stance” (Biber et al., 2002, p. 304) whereas those “with verbs and adjectives are typical grammatical markers of stance” (Biber et al., 1999, p. 966), favoring the latter heads seems to be warranted by their efficiency as vessels for the writers’ viewpoint. Consider these concrete samples from the corpus that testify to the authors’ choices:

- (5) SP38: It is **important** to investigate exercise motivation and cognitions among individuals who do not exercise (adjectival)
- (6) SP96: interventions based on data generated from exercising samples are **unlikely** to be effective for non-exercisers (adjectival)
- (7) SP120: Previous research **has shown** the Self-Attributes Questionnaire to be a valid and reliable measure of self-esteem (verbal)
- (8) M78: The results **appeared** to be robust (verbal)
- (9) M89: development of extensor lag would affect their **ability** to work (nominal)
- (10) SP156: Cognitive factors include **intention** and **willingness** to try substances (nominal)

These examples bear witness to Biber’s (2006) claim that stance can be transmitted with varying extents depending on the grammatical devices used to express it, making for a continuum that ranges from explicit to implicit degrees of authorial involvement. To explain this concretely, unlike in the excerpts where the adjectives and verbs offer different clines of overt (5; 7) and covert or hedged (6; 8) evaluation of previous or current results, the nominal heads in (9) and (10) confine the writers within a limited frame of stance marking as they rather function to “represent human goals, opportunities, or actions” (Biber et al., 1999, p. 653).

These findings rally with those of Biber (2006) and Kozáčíková (2015) whose corpora of spoken and written university registers and Linguistics papers, respectively, have shown a similar distribution of predication to the current corpus of RAs. The rarity of nominal and adjectival predicates preceding nominal to-clauses seem to be the general probability of all registers (Biber, 2006), which is why disciplinary variation at that level cannot be traced in the currently-investigated corpus. For this reason and because of the attested semantic richness of verbal heads compared to adjectives, a thorough analysis of verbal predication in nominal infinitival clauses will be conducted in the next section. This step of analysis is meant to uncover the different uses of to-clauses associated with stance-taking as well as foreground any disciplinary differences in the choice of verbal predicates.

4.2.2. Semantic analysis of verbal predicates

The 9 different types of verbal predicates preceding to-clauses, as classified by Biber et al. (2002), are extracted from both sub-corpora and their occurrence is reported in Table 4.

Table 4: Semantic distribution of verbal predicates in both disciplines

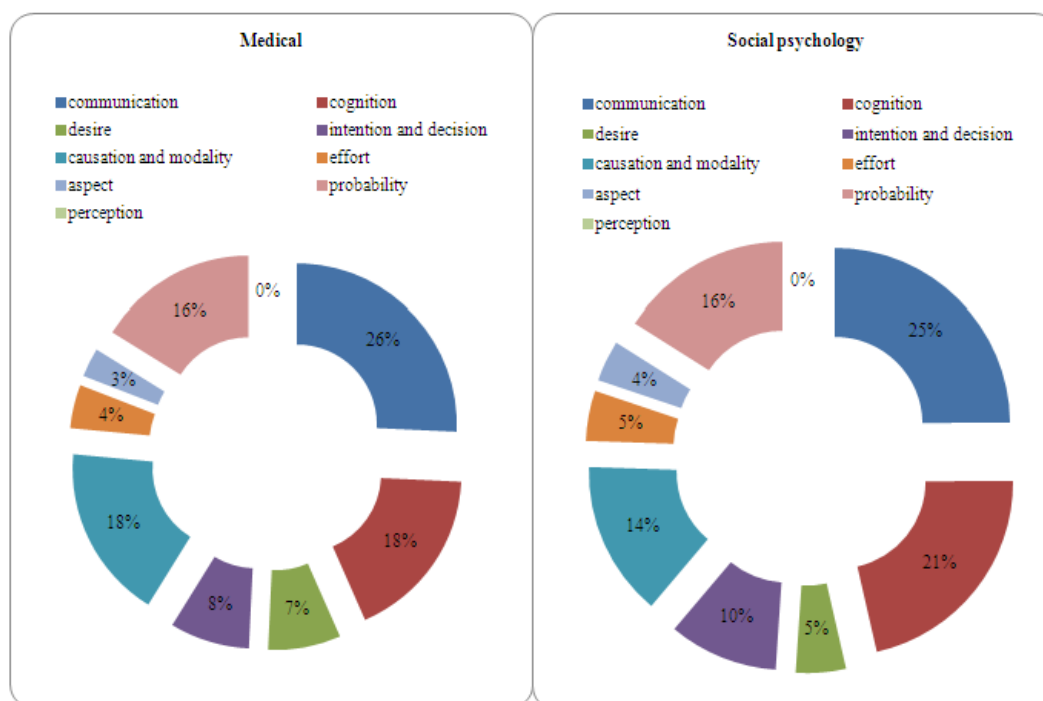
Semantic domain of verbs	Medical articles	Social psychology articles	Total
Speech act/communication verbs	35	59	96 (26%)
Cognition verbs	24	51	73 (20%)
Verbs of desire	10	11	21 (6%)
Verbs of intention and decision	11	24	35 (9%)
Verbs of causation/modality	24	35	58 (15%)
Verbs of effort	6	10	17 (5%)
Aspectual verbs	4	9	13 (3%)
Verbs of probability	22	38	60 (16%)
Verbs of perception	0	0	0 (0%)

As is apparent from Table 4, the writers in both medical and social psychology RAs have recourse to particular classes of verbal heads to introduce nominal to-clauses while they seem to avoid and sometimes do without some other semantic domains. In terms of numbers, this translates into three main categories: (a) verbs which have a considerable weight like Speech and Communication as well as Cognition verbs, (b) verbs with moderate occurrence such as probability and intention, and (c) verbs with very low frequency that does not amount to 25% when combined (desire, effort, aspect).

In an attempt to account for the disproportion and noticeable favoring of semantic verbal classes over others while vesting scientific knowledge into nominal to-clauses, it is noted that the verbal predicates that rank higher all belong to the category of stance markers as identified by Biber et al. (1999, p. 667). More than that, each of the first three predominant verbal heads typically reports a different kind of stance (*ibid.*). This indicates that the authors in the selected RAs target specific functional meanings associated with stance-taking.

In terms of disciplinary variation, visually and statistically as suggested in Figure 1, differences can be hardly traced at the level of verbal predication.

Figure 5: Verbal predicates distribution across disciplines



To prove the statistical insignificance of the variation across disciplines, the chi-square test is calculated automatically and its value (3.74) is found to be inferior to the significance level (13.36) under the 1% probability of error (Triki & Sellami-Baklouti, 2002, p. 56). Yet, a comparative look at the set of verbs used from each of the highly-ranked semantic domains indicates numerical as well as qualitative differences across disciplines in relation to the nature as well as the force of stance invested in the controlled to-clauses (see Appendix).

In order to identify the different types and degrees of stance transmitted through nominal to-clauses headed by verbs as well as bring to the fore any functional differences in the use of these structures across disciplines, the next step of analysis focuses on the verbal predicates which are both frequent and typically evaluative and compares their frequency and use across disciplines.

4.2.2.1. Communication and speech act verbs

As reported in Figure 5, communication and speech act verbs figure predominantly in medical as well as social psychology RAs. Favoring this semantic type of verbal heads can be attributed to its functional potential as a “reporting structure”, which is “a defining feature of the academic research article” (Hyland, 2002, p. 115). In fact, not only do these verbs allow the authors to specify the type of information or activity that is reported but also and more importantly to “indicate the degree of certainty associated with [this] reported information” and whether it should be taken as an unquestionable claim or not (Biber et al., 1999, p. 667).

Owing to the multitude of evaluation possibilities they offer, then, the communication verbs identified in the selected corpus are found to vary in terms of density and form choice from one sub-corpus to the other, thus signaling the first notable instance of variation in expressing stance in the analyzed corpus. Whereas the hard discipline of medicine features more than one verb of strong assertion such as “show”, “demonstrate” and “confirm”, soft knowledge in social psychology papers is reported through one sole verb of assurance (show) plus a series of other verbs (posit, suggest) which indicate less certainty and more doubt (see Appendix).

- (11) M204: Expression of either CK5/6 or epidermal growth factor receptor (EGFR) **has been shown** to accurately identify basal-like tumors
- (12) M214: The saliva rapid culture assay we used **has been demonstrated** to be at least 98% sensitive in identifying infants with congenital CMV infection
- (13) M199: 32 children **were confirmed** to have congenital CMV infection
- (14) SP108: the interpersonal circumplex **has been shown** to have considerable utility as a means for clarifying the interpersonal meaning and content of various constructs

While the ultimate goal of academic writers is to convince “peers to assent to a knowledge claim” while making scientific advances (Hyland, 2004, p. 12), the examples above show how this pressing requirement is pursued through different rhetorical means that are disciplinary distinctive.

For the medical writers affiliated with the hard domain of knowledge construction, the category of communication verbs known as ‘boosters’ – which act as supportive of a positive stance – seem to be the most luring (Hyland, 2005a). As indicated in (11), (12) and (13), these verbs relay the authors’ strong commitment to the proposition embedded in the to-clause which is framed to be “accepted as known information” (Biber et al., 1999, p. 706). This is carried out through a dual process which starts with situating one’s work within a well-established body of literature (11; 12) that serves as a factual framework to validate the newly-advanced claims. This stresses the cumulative and empirical nature of hard knowledge which emanates from experimental procedures conducted in laboratories and is therefore more likely to build a persuasive schema in the minds of the readers than mere attitudinal interpretations of the researchers (Hyland, 2005b). As a follow-up, the second step of marking stance and engaging with the audience consists in presenting the findings with the same degree of commitment (13) as they naturally spring out of “the correct application of prescribed procedures” and are thus less likely to be rejected or questioned for their validity (Hyland, 2004, p. 33).

On the contrary, the social psychology writers seem to follow the same first step in the evaluative cycle as their medical peers while the second step appears to be hard to observe because of differences in disciplinary assumptions about knowledge construction. To explain more, while the authors in the analyzed soft RAs also need to promote and accommodate their results with much assertion, they are aware that soft knowledge is complex, flexible, unpredictable and “open to greater interpretation” (Hyland, 2004, p. 31). Accordingly, they assertively present their claims exclusively to prove that they are retracing accredited steps from the literature (14) but do so with less confidence to report their own results by resorting to weaker verbal predicates of stance as indicated in the following examples.

- (15) S: The latter two constructs also **have been suggested** to be integral contributors to the explanation of gender differences in occupational choice
- (16) S: Given the suggested gender differences in implicit theories of intelligence, where women **are posited** to have a greater tendency to believe that their abilities are fixed

The use of predicates with low degrees of certainty such as ‘suggest’ and ‘posit’ (Biber et al., 1999) occurs when the nominal clause exposes data that pertains to human beliefs and behavior (15; 16) which generally escape static frames and definite organization, and is accordingly more subject to falsifiability. It is noted that more focus is rather put on explaining how the subjects are directed to exhibit these behaviors through speech act verbs (ask, invite, instruct) (see Appendix).

To sum up, the results related to one of the most frequently used verbal predicates in nominal to-clauses parallel those of Hyland (2004) who affirmed the density of strong verbs of assertion like “show” and “demonstrate” in science and engineering countering the prevalence of less assertive verbs like “suggest” in social sciences. Yet, in the present corpus, the gap in terms of numbers is not as huge as the one reported in the literature, which attests to the endeavors of the writers from the soft camp to emulate the rationality, empiricism and reliability of hard disciplines to the extent possible. It is revealed, on the other hand, that the inescapable difference in the nature of knowledge per se cripples those ambitious endeavors to be reliable grantors of “absolute truth” (Hyland, 2005b, p. 87). This restriction, which emanates from disciplinary differences, has been traced in the use of non-assertive verb forms that are absent in the medical science corpus. The same practice recurs with the different uses of cognition verbs as explained more in the next sub-section.

4.2.2.2. Cognition verbs

Just like communication verbs, predicates denoting mental states are one of the most frequent heads that control nominal to-clauses in both sub-corpora. One possible explanation for this preference of cognitive verbs is their liability to encode another type of stance related to the epistemic status of the proposition (Biber et al., 1999; Hyland, 2005a). Though they are also part of what Hyland (2002) classifies as “reporting verbs”, their use in the analyzed corpus reflects another side of academic interactions which is based on the community consensus that “readers are guarantors of the negatability of claims” (Hyland, 2004, p. 13). To explain more, while persuading peers to accept novice claims by presenting valid warrants for one’s position is highly crucial as seen in the previous section, showing awareness that knowledge-making is a dual process where readers can actively intervene to reject claims or offer opposing interpretations is an equally praised practice within academic productions (Hyland, 2004; Hyland, 2005a). Consider these examples from both disciplines.

- (17) M19: We **estimated** the expected survival rate among control group participants at 15 months’ follow-up to be 91%

- (18) M32: The greatest relative increases in diabetes in the next 25 years **are predicted** to occur in the Middle Eastern crescent, sub-Saharan Africa and India
- (19) SP86: fathers **are presumed** to exhibit maturity, responsibility, or leadership
- (20) SP147: an abstract-analytic thinking **is supposed** to be the reflection ...

The knowledge transmitted through the nominal infinitival clauses in these examples is downgraded to the status of an opinion which merely reflects the authors' attitudinal judgment towards its degree of veracity rather than their factual reasoning based on accumulated evidence. This use in relation to stance-taking foregrounds the allegiance of the writers to their respective discourse-community expectations of showing respect to their peers. Once this is done excessively, however, it might undermine the quality of the findings and give the impression that human intervention is valued over experimental rigor, which is totally undesirable in hard domains of knowledge. It is for this reason that this practice is observed to occur more prominently in the social psychology corpus where the authors tend to use a more varied range of cognitive predicates that convey a high level of doubt such as 'hypothesize', 'think', 'believe' and 'expect'. Notably, the latter verb figures 19 times in sub-corpus 2, making it the most abundant controlling predicate with a tentative scope. Contrariwise, the hard science writers report their views more moderately by avoiding these verbs and carefully choosing other variants that are more assertive or neutral such as 'know', 'find' and 'consider' (see Appendix).

- (21) SP25: Appearance and energy imagery **are hypothesized** to serve motivational functions
- (22) SP188: Self-efficacy **is thought** to be central to the development of occupational choice
- (23) SP227: The one exception was for Science SC/SE, which we **expected** to be related to performance prediction for Mathematical Jobs
- (24) M109: The association between ER status and mortality **is known** to be time dependent
- (25) M79: Pneumococcal vaccination **was** also **found** to have no effect on MI in another case-control study

From these samples, it seems that the writers in the sub-corpus of medicine show more balance in choosing how to frame information into to-clauses through cognition verbs. As pointed out by Swales (1990, p. 175), the RA in hard areas of knowledge needs to uphold a dual persona in which there is an interconnection between its status as "a peer-group intellectual object" on the one hand and "authorial intrusion mainly in contexts thought to need persuasive support, or to need some revelation of the authors' individual cognitive processes" on the other. Over indulging in speculations and personal assumptions, thus, clashes with the regularization and standardization of 'hard' sectors of knowledge. This prudence could not be traced in the sub-corpus of social psychology where there is a tendency to subscribe to the 'tentative' spectrum of reporting verbs, which is conditioned by the uncertainties coupled with knowledge generation in the humanities.

4.2.2.3. Probability verbs

Verbs of probability represent the third widely used verbal predicates of nominal to-clauses with a stance function in both sub-corpora. Again, their frequency stems from the different kind of evaluation they can offer compared to communication and cognition verbs. As a matter of fact, contrary to these latter verbal heads, probability verbs do not allow the authors to ascribe views or assess them with varying signals of positive, tentative, neutral or negative position (Hyland, 2004). Rather, their use falls exclusively under the 'tentative' function as they report the degree of likelihood of a proposition (Biber et al., 1999). It is for this reason that they are counted as part of the category of "hedges" as identified by Hyland (2002). Accordingly, in both sampled disciplines, they are found to continue the cycle of demonstrating solidarity with community peers by opening "a discursive space where [they] can dispute their interpretations" (Hyland, 2005a, p.179).

- (26) M78: The results **appeared** to be robust
- (27) M118: the basal markers **seem** to have no prognostic significance within the HER2-positive subtypes of disease
- (28) SP88: we found that a father **tended** to be held to (non-significantly) lower standards than a man without children
- (29) SP155: The ambiguous association ... **appears** then to be better clarified

Because all of these excerpts feature nominal clauses where the writers' own findings and contributions are being reported, verbs of probability are called for to frame these results to be received by the readers as provisional statements rather than definitive claims. This way, the authors demonstrate their acknowledgement of the appropriate rules of conduct that follow from engaging in academic productions of scientific knowledge. These rules – which dictate modesty, coyness and self-effacement as well as careful consideration of community

ethos – are typical of all academic interactions irrespective of disciplinary affiliations, which is probably why they are equally embedded in both analyzed sub-corpora through infinitival clauses controlled by probability verbs.

That being said, disciplinary variation cannot be ruled out in light of the abundant recurrence of the predicate “tend” (19 instances) which ties with the previously-analyzed predicate “expect” in social psychology, making the percentage of tentative predicates preceding to-clauses override that of boosters or assertive verbs in sub-corpus 2 (see Appendix). Though the gap between disciplines in the current study is not wide, it still confirms previous research on the supremacy of human agency in the process of claim-making and how knowledge in soft fields is more liable to criticism and discountenance, and so it needs to be hedged through rhetorical devices to block or lessen any self-threatening reactions (Swales, 1990; Hyland, 2002). In domains like social sciences and humanities (Hyland, 2002), Linguistics (Hyland, 2004; Kozáčíková, 2015) and SLA (Yeganeha & Boghayeria, 2015), the use of mental and probability verbs working as heads of nominal infinitival clauses is found to be extensive, making the currently-analyzed papers from the soft camp of knowledge no exception.

4.2.2.4. Desire verbs

The fourth category of verbal predicates heading nominal to-clauses and expressing stance in the sampled RAs consists of verbs of desire. Being a “subset of mental verbs” (Biber, et al., 1999, p. 706), these predicates are less frequent than the latter and their uses are found to be the most restricted among all previously-analyzed verbal stance markers. This can be rendered to their focus on the internal desires and needs of the speaker rather than their evaluation of an external claim or view. Projecting personal drives and wishes into one’s research endeavors is not an agreed-upon practice within the community of science and academia. Indeed, as discussed previously, the more they are based on human intervention, the more the advanced claims, methods or results are object to fallibility, especially in the hard domain of knowledge (Hyland, 2002). The fact that the soft discipline of social psychology equally employs a rare set of these verbs attests to their awareness that excessive immersion within the production of knowledge can compromise their aspirations to be on a par with other hard disciplines. Like them, then, they employ desire verbs mainly to report the participants’ feelings and reactions while being part of the study as exemplified in these excerpts.

- (30) M49: they did not **wish** to participate in the study
- (31) SP4: they will **want** to see themselves as more responsible for favorable outcomes and less responsible for unfavorable outcomes

This comes in contradiction with Kozáčíková’s (2015) findings where the construction “verb of desire + to-clause” represents more than 20% of all evaluation forms used in both native and non-native papers of Linguistics. This difference between disciplines belonging to the same soft paradigm might be revealing of the non-uniformity of social psychology which can be placed somewhere on the middle of the Hylandian cline rather than on the extreme end of soft sciences (see section 3).

V. Conclusions

Following the analysis of infinitival nominal clauses headed by verbs, it can be concluded that the primary function of these frequently-used non-finite forms – compared to their adjectival and adverbial variants – is evaluative. Indeed, the investigation of the different semantic domains of their verbal controlling predicates has led to the detection of recurrent patterns whose primary function is expressing the authors’ stance towards their advanced scientific claims with varying nuances that ranged from boosting and hedging to criticizing and distancing. Precisely, communication, cognition and probability verbs are found to be the most preferred heads introducing to-clauses with a nominal function in both disciplines for their liability to offer various degrees of engagement with the reported proposition. Indeed, the double-functionality of these predominantly-used predicates seems to perfectly fit the duality of academic interactions where rigorous experimentation and assertive conclusions about newly-advanced scientific claims are as crucial as modest and hedged arguing for one’s position as well as consideration of peers’ valuable role and unquestionable rights of criticism and negative reception.

As far as disciplinary variation is concerned, the findings in the current study support previous research on how stance-taking is disciplinary-bound (Swales, 1990; Swales, 2004; Hyland, 2004; Hyland, 2005b; Vázquez & Giner; Yang, 2014). Although the variation is found to be too little for it to be statistically significant, the deep qualitative analysis has uncovered several notable differences in the choice of the verbs belonging to the same semantic domains. A case in point is the category of communication verbs from which the writers of medical articles pick the most assertive types on the opposite of the social psychology authors who tend to occasionally inject their infinitival propositions with uncertainty predicates that reflect their

doubtful claims. Much in the same vein, the range of cognition verbs figuring in the sub-corpus of social psychology reveals their overreliance on authorial presence to convey their skepticism towards the expected outcomes of their research. This doubtfulness features less frequently in medical articles that employ a rather limited range of cognition verbs expressing speculation and personal belief. This dissimilitude is an expected corollary of the specificity of each scientific camp in which knowledge generation is restricted by the quantifiable versus the immeasurable entities and variables in hard and soft disciplines respectively. Irrespective of these minor differences, the other remaining uses of probability and desire verbs, which also express stance in both sub-corpora, do not reveal any notable variation.

Taken altogether, the results of this study allow for departure from the classical and typical clear-cut classifications of hard and soft disciplines into opposing extremes of knowledge generation towards a more flexible standpoint that takes into account the continual changes that currently-existing genres keep displaying to fit the requirements of the whole community in academia (Tessuto, 2012). The Hylandian cline (Hyland, 2004) should therefore stand as a point of reference whenever these disciplines are compared for more accurate conclusions to be advanced.

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Appendix

Semantic domain of verbs	Medical articles		Social psychology articles	
	Verbs used	Number of occurrences	Verbs used	Number of occurrences
Communication/speech act verbs	show ask report invite confirm demonstrate define	10 11 5 2 5 1 1	show ask report invite tell instruct inform purport claim urge advise suggest posit caution	12 22 1 1 2 12 1 1 1 1 1 1 2 1
Cognition verbs	consider expect know deem believe find calculate assess predict estimate	8 4 3 1 1 2 2 1 1 1	consider expect know hypothesize believe find think presume pretend suppose assume	6 19 2 3 3 7 4 1 2 2 2
Verbs of desire	prefer want need wish	1 3 5 1	prefer want need wish	1 4 4 2
Verbs of intention and decision	agree refuse plan choose consent aim	2 2 1 4 1 1	intend refuse plan choose decide	19 1 1 1 2

Verbs of causation and modality	help allow encourage enable lead arrange permit require have	5 4 1 2 1 1 1 3 6	help allow encourage enable lead cause obligate require have get force induce serve	2 6 3 3 1 1 1 2 10 1 1 2 2
Verbs of effort	fail seek attempt	3 2 1	fail seek attempt bother try	1 4 2 1 2
Aspectual verbs	continue begin remain	2 1 1	continue begin remain start	3 1 3 2
Verbs of probability	tend seem appear turn out come	7 5 8 1 1	tend seem appear turn out	19 2 16 1

Najla Fki. "The Expression of Stance in Research Articles: A Semantic Study of Verbal Predication in Infinitival Nominal Clauses." *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 26(06), 2021, pp. 58-70.