Editorial: A Typology of Verbs for Scholarly Writing

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Clarity and precision are core principles of expository writing. The methodological process of writing entails the careful selection of words, including the appropriate use of verbs. According to the American Psychological Association Publications Manual (2010) guidelines, "verbs are vigorous, direct communicators" (p. 77). In this article, we present exemplars of scholarly writing and the use, inaccurate use, and overuse of the verb found. We expand upon additional coming-to-know verbs (Meyer, 1997) using the Typology Lists of Verbs for Scholarly Writing (Frels & Onwuegbuzie, 2010) for authors to discriminate verbiage for meaning and clarity in writing. Furthermore, we create a typology of verbs wherein an array of verbs is categorized and classified according to each major section of an empirical research article.

Academic writing, or scholarship production, involves a fundamental and conscientious approach for "forging a commitment to become prolific" (Johnson & Mullen, 2007, p. 4). Scholars use the written language of syntax and grammar to convey intentionality and information (Gee, 2005). Challenges for writers successfully to conform to style guides (cf. Daniel & Onwuegbuzie, 2007; Hughes, Daniel, Onwuegbuzie, & Slate, 2010; Juve, Weiser, Kennedy, Davis, & Rewey, 2000), such as American Psychological Association (APA, 2010), combined with challenges of linguistic descriptions (e.g., Hahs-Vaughn & Onwuegbuzie, 2010) and conventional descriptions (e.g., Leech & Onwuegbuzie, 2010; Leech, Onwuegbuzie, & Combs, in press; Zientek, Capraro, & Capraro, 2008) can be vast. Indeed, authors who submit poorly written manuscripts to journals can be nearly 12 times more likely to have their manuscripts rejected than are their counterparts (Onwuegbuzie & Daniel, 2005). With these ideas in mind, based on Onwuegbuzie and Frels' (2010) examination of the use, overuse, and misuse of the verb *found* throughout the published literature, the purpose of this editorial is to differentiate verbs utilizing the *Typology List of Verbs for Scholarly Writing* (Frels &

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Onwuegbuzie, 2010) and to provide a framework for identifying appropriate verb usage in the academic discourse.

The Function of Verbs

Meaning through formal writing, at the discourse, sentence, or word level, provides the fundamental bridge among language, cognition, and perception components for reader comprehension (Burgess, Livesay, & Lund, 1998). Thus, authors should strive to make certain that every word means exactly what they intended (APA, 2010). Precision is especially important for scholarly writing in general and the writing of empirical articles in particular (Szuchman, 2008). As such, especially with respect to empirical research where precision of language is even more important, verbs take on added significance. As noted in the sixth edition of the *Publication Manual of the American Psychological Association* (APA, 2010), hereafter called the *Publication Manual*, "verbs are vigorous, direct communicators" (p. 77). In fact, verbs could well be the most important word in a sentence because a reader might be able determine the meaning of a sentence as a result of the appropriate verb.

The *Publication Manual* (APA, 2010) presents guidelines with respect to grammar and usage regarding selecting appropriate verbs. Authors of the fifth edition of the *Publication Manual* (APA, 2001) and the sixth edition of the *Publication Manual* (APA, 2010) stated that the past tense of verbs should be used to express an action or a condition that

occurred at a specific, definite time in the past, particularly when discussing another researcher's work and when reporting results (APA, 2001, p. 42; APA, 2010, p. 77). The use of the present perfect tense should be used to express a past action or condition that did not occur at a specific, definite time, or to describe an action that began in the past but continues into the present (APA, 2010). In addition, active voice is recommended rather than passive voice, with the exception of expository writing (narrative writing), whereby an author chooses to focus on the object or recipient of the action rather than on the actor (APA, 2010).

With regard to precision and clarity, authors of the *Publication Manual* (APA, 2010) provide another consideration for scholars regarding verb selection, verb agreement, and sentence structure. Attribution is defined as "inappropriately or illogically attributing action in an effort to be objective" (p. 69). Therefore, when considering active tense verbs, authors are cautioned to avoid attribution, specifically anthropomorphism and "not [to] attribute human characteristics to animals or to inanimate sources" (p. 69). Two examples of anthropomorphism are: (a) *schools established program services* and (b) *recent studies reported*. Therefore, verb tense, verb voice, and avoiding anthropomorphism are important for expressing ideas in a more concise and clear manner.

Through the use of a clear writing process (e.g., scholarly reports and narratives), the investigation process, as a result, becomes closely bound to ordinary human activities (Meyer, 1997). In fact, Meyer (1997) noted an integral relationship between research and the writing process and the importance of verbs. With respect to academic writing, the verb *find*—and its derivative *found*—are the most frequently used verbs and represent the basic and central core of academia (Meyer, 1997). Authors of *The Concise Oxford English Dictionary* (2008) defined the verb *find* as "discover by chance or deliberately…discover information or a fact…succeed in obtaining" (p. 508). Based on the roots of language, authors of *The Barnhart Dictionary of Etymology* (1988) defined the verb *find* from the root *finden*, developed from old English: to come upon, or bring *a light on*. Concomitantly, authors of *The Oxford American Writer's Thesaurus* (2008) listed synonyms of the verb *find* as "discover, find out, learn, realize, fathom, ascertain, originate, devise, design, contrive, conceive of, pioneer, [and] develop" (p. 238).

Inaccurate Instances and Disproportionate Use of the Verb Found

As editors, authors, and educators, we recently reflected upon the meaning of the verb *found* to describe the acquisition of academic knowledge and its use and often overuse within scholarly publications. Apparently, researchers, especially beginning researchers, seem to struggle with the writing process (Onwuegbuzie, 1997), which often leads to the use of a narrow choice of verbs. Recently, Onwuegbuzie and Frels (2010), who examined the frequency of verbs used in qualitative, quantitative, and mixed research articles, provided support for Meyer's (1997) contention that the verb *found* is the most frequently used verb. For example, with respect to mixed research articles, Onwuegbuzie and Frels (2010) examined the 121 mixed research articles identified by Collins, Onwuegbuzie, and Jiao (2007) across the entire population of electronic bibliographic records of all available fields of social and health sciences for all the years for which records existed through 2007, which comprised 15 electronic bibliographic databases that represent the most widely used electronic sources in the fields of social and health sciences: ABI/Inform Global (ProQuest), Academic Search Premier (EBSCOHost), Business Source Premier (EBSCOHost), CINAHL (EBSCOHost), Education Full-Text (WilsonWeb), ERIC (EBSCOHost), Health Reference Center (Gale InfoTrac), Health Source: Nursing/Academic Edition (EBSCOHost), PsycARTICLES (EBSCOHost), PsycINFO (EBSCOHost), EconLit (EBSCOHost), Education: A SAGE Full-Text Collection (CSA Illumina), Sociological Abstracts (CSA Illumina), Social Services Abstracts (CSA Illumina), and PAIS International (SilverPlatter). Onwuegbuzie and Frels (2010) documented that 95.6% of the mixed research articles contained the verb *found*, with an average of 6.60 instances of the verb *found* per article. Further, in a review of 33 mixed research articles that were identified by Mallette, Moffit, Onwuegbuzie, and Wheeler (2008) in the field of literacy research that were published either in *Reading Research Quarterly* ($n = 21$) or *Journal of Literacy Research* ($n = 12$) between 2003 and 2008, Onwuegbuzie and Frels (2010) reported that all 33 articles contained the verb *found*, with the total of 447 instances yielding an average of 13.55 uses per article. In contrast, for the journal *Research in the Schools*, where the editors strive to minimize use of the verb *found*, the usage in published articles is substantially less than is the usage of the verb *found* in other journals. For instance, in the Spring 2009 issue of *Research in the Schools*, although five of the six documents contained the verb *found*, a total of only 13 instances was present, which represents a relatively low usage average of 2.17 incidences per article (Onwuegbuzie & Frels, 2010). However, as concluded by Onwuegbuzie and Frels (2010), this latter result appears to represent more of an exception than the rule.

Examining the content of 110 manuscripts submitted to *Research in the Schools* over a 6-year period, Onwuegbuzie, Combs, Slate, and Frels (2009) documented the prevalence of APA errors. Of the manuscripts reviewed, 56.36% of them contained errors relating to precision and clarity, with verb tense and attributions (i.e., anthropomorphism) ranking highest. Specifically, approximately one third of authors (i.e., 32.27%) misused verb tenses, committing errors such as: (a) shifting abruptly in verb tense within the same paragraph, (b) failing to use past tense verbs to describe the results of the study or to report previous findings, and (c) failing to use present tense verbs in the discussions and conclusions (Onwuegbuzie et al., 2009). Furthermore, Onwuegbuzie et al. (2009) reported that 27.27% of authors inappropriately attributed action to inanimate objects (i.e., anthropomorphism).

The *Publication Manual* (APA, 2010) contains sample papers illustrating three kinds of manuscripts adapted from articles published in APA journals. When referencing the sample one-experiment paper (APA, 2010, p. 41), the verb *found* was discovered in three consecutive sentences. Furthermore, of the eight total active-voice verbs presented in the two pages of the sample manuscript, the verb *found* represented five of them–strongly suggesting an overuse of this verb. Not only does the overuse of the verb *found* (i.e., frequently and in consecutive sentences) represent poor writing, but, more importantly, the use of the verb *found* can be extremely misleading. For example, in several of the studies examined by Onwuegbuzie and Frels (2010), authors used the verb *found* when discussing another author's concept, theory, or model, instead of using verbs such as *conceptualized*, *theorized*, or *predicted*, respectively. With this in mind, the verb *found* is often not the most appropriate verb to be used at all times.

Conceptual Framework

Lester (2005) described the use of a conceptual research framework as a notion of justification for research for equally "insiders' and outsiders' views" (p. 460) to highlight specific concepts and their interrelationships. Based on the conceptual framework of considering specific meanings attributed to *coming-to-know* verbs (i.e., verbs for acquiring knowledge) identified by Meyer (1997), we developed the *Typology Lists of Verbs for Scholarly Writing* (Onwuegbuzie & Frels, 2010) for authors to consider alternate verbs to the verb *found* when discriminating the textual representation of acquiring knowledge. Meyer (1997) suggested that in the case of academic discourse, most verbs have the following commonalities: (a) the verb involves the human

participant as a scholar; (b) the verb flows into a described event; (c) the object of the verb is knowledge of the object studied; and (d) the verb describes the cognitive achievement, or knowing, as the result of some intentional action. As noted by Meyer (1997), "researchers don't find out things, they find" (p. 154). Hence, the verb *find* is useful in academic contexts to describe epistemic (i.e., relating to knowledge) gains. Meyer (1997) posited that "as long as there is an agent who finds, there is an experiencer [i.e., consumer] who sees" (p. 156). As such, "*finding* is a cognitive achievement, and *finding* is an attitude" (p. 166, emphasis added).

Furthermore, Meyer (1997) described an array of verbs for researchers to consider, and categorized other verbs stemming from the verb *found* to include some of the following: (a) mental verbs (i.e., realize, recognize); (b) speech-act verbs (i.e., argue, assumption, explain, describe, recommend); (c) given an object verbs (i.e., adjudge, consider, diagnose, identify, interpret, judge, regard as); (d) exercise of logic verbs (i.e., conclude, infer, deduce); (e) emphasis on source (i.e., learn, gather); (f) emphasis of elusiveness of object (i.e., detect, trace); (g) emphasis on novelty (i.e., discover, reveal, invent); and (h) emphasis on certainty or precision (i.e., determine, ascertain). Using Meyer's (1997) concept of verb discrimination, our *Typology Lists of Verbs for Scholarly Writing* comprises three elements (e.g., verbs, verbs representing cognition, and verbs representing knowledge or action) and 15 categories. The purpose of the remainder of this article is as follows: (a) to discuss our procedure for creating the *Typology Lists of Verbs for Scholarly Writing*, (b) to outline a framework to be used for the selection of verbs, and (c) to consider the implications of appropriate verb usage in academic discourse.

Procedure

Using an iterative process whereby an a priori technique (Constas, 1992) was the means of seeking and identifying verbs, we examined and sorted verbs used in scholarly writing. After data (i.e., verbs compiled through readings) were collected, an *a posteriori* technique (Constas, 1992) was the means for the naming of categories. Sources for the categories were our own experiences with the writing process and numerous articles that we examined over the period of months prior to writing this editorial.

With respect to the iterative process, steps of selecting, coding, and categorizing verbs were repeated until we differentiated verbs according to general meaning and appropriate use in academic discourse. Specifically, we conducted a keywords-in-context (KWIC) analysis to examine how verbs were used in context with other words. Leech and

Onwuegbuzie (2008) noted the underlying assumption of KWIC to be that "people use words differently and, thus, by examining how words are used in context of speech, the meaning of the word will be understood" (p. 594). Therefore, considering verbs within the context that surrounded them facilitated our development of the *Typology Lists of Verbs for Scholarly Writing*.

Framework for the Selection of Verbs

Through the data analysis and the iterative process of selecting and naming verbs, a total of 195 verbs were sorted into the following 15 categories: (a) evidence-based/data driven verbs (e.g., verbs that acquire data or evidence); (b) explicit verbs (e.g., verbs that directly state); (c) implicit verbs (e.g., verbs that imply); (d) inclusive verbs (e.g., verbs that encompass more than one element); (e) procedural verbs (e.g., verbs that specify the procedure used); (f) interpretation verbs (e.g., verbs that specify the form of inferences made); (g) proposition verbs (e.g., verbs that suggest); (g) visual verbs (e.g., verbs that display); (h) comparison verbs (e.g., verbs that link two or more elements); (i) verification verbs (e.g., verbs that verify or confirm); (j) creation verbs (e.g., verbs that originate); (k) cognitive process verbs (e.g., verbs that refer to thoughts); (l) perception verbs (e.g., verbs that refer to observation); (m) direct object verbs (e.g., verbs that refer to an object or act); and (n) reference verbs (e.g., verbs that refer to another element or act). Next, the 15 categories were grouped according to general meaning and contextual relationships of verbs: (a) pertaining to, reporting, or statement verbs (e.g., declaring, stating); (b) cognitive effort verbs (e.g., thinking, perceiving); and (c) evidencing knowledge verbs (e.g., knowing, doing) for creating the *Typology Lists of Verbs for Scholarly Writing*.

Typology of Verbs

Verbs in academia (i.e., coming-to-know verbs; Meyer, 1997) are distinguished by the particular aspects of semantic understanding as described by Johnson and Maratsos (1977) that "thinking can be false; that knowing presumes truth; that thinking is not equivalent to saying" (p. 1744). Therefore, the typology of verbs comprised three major discriminating values: (a) verbs representing statement, (b) verbs representing cognition, and (c) verbs representing knowledge or action. With this in mind, regarding the verbs representing statement, particular verbs of the 15 categories were sorted into three genres: (a) explicit (i.e., clear, overt) verbs (e.g., affirmed, reported); (b) implicit (i.e., implied, ambiguous) verbs (e.g., speculated, associated); and (c) inclusive (i.e., descriptive) verbs (e.g., comprised, included). Explicit verbs indicate direct

communication (e.g., researchers documented), whereas implicit verbs indicate subtle communication (e.g., researchers speculated). Inclusive verbs are used to describe the connections between or among elements (e.g., the survey *included*). Table 1 depicts verbs categorized as *verbs representing statement*. Conversely, verbs representing cognition refer the act of holding a belief or thought. Thus, the typologies of such verbs are as follows: (a) cognitive process verbs (e.g., believed, scrutinized); (b) perception verbs (e.g., perceived, felt); (c) comparison verbs (e.g., distinguished, differentiated); (d) verification verbs (e.g., corroborated, reviewed); reference verbs (e.g., consulted expected); and (e) proposition verbs (e.g., reviewed, maintained). Table 2 illustrates verbs categorized as *verbs representing cognition.*

Finally, verbs representing knowledge or action refer to the presumption of truth, or finding evidence for truth either by coming-to-know or by some type of action and include: (a) procedural verbs (e.g., conducted, analyzed); (b) visual verbs (e.g., displayed, confirmed); (c) evidence-based/data driven verbs (e.g., tested, embarked); (d) creation verbs (e.g., engendered, generated); and (e) direct object verbs (e.g., sampled, developed). These verbs are particularly useful for empirical research and, as noted by Meyer (1997), represent the most frequently used verbs in this genre. However, each verb is distinct in meaning, and cannot easily be substituted for another. For example, the authors of the sample one-experiment paper presented in the Publication Manual (2010) stated: "[some researchers] found that like younger adults, older adults detected threatening faces more quickly than they detected other types of emotional stimuli" (p. 43). Thus, the verb *discovered* might appropriately replace the verb *found* as follows: "[some researchers] have [discovered] that like younger adults, older adults detected threatening faces more quickly than they detected other types of emotional stimuli" (APA, 2010, p. 43). In contrast, the verb *observed* in the same sentence would change the meaning slightly: "[some researchers] have [observed] that like younger adults, older adults detected threatening faces more quickly than they detected other types of emotional stimuli" (APA, 2010, p. 43). Table 3 depicts verbs representing knowledge or action. Often times, authors tend to use the verb *found* in a one-size-fits-all manner. Yet, a misused verb can mask the process by which the knowledge came to the fore. Therefore, writers might consider that verbs not only vary in meaning through the process by which specific knowledge originated (e.g., *found* vs. *experienced*), but particular verbs are stronger in meaning than are others. For example, Meyer (1997) expanded on the verb *find*, and ranked other coming-to-know verbs from the *basic level* (weakest) of meaning (e.g., discover,

reveal) to an *intermediate strength* of knowing (e.g., detect, learn, observe) to a more definite stage that he defined as a *stage beyond doubt* (e.g., determine, ascertain). Another important consideration is that some verbs overlap from one category to another and thus are quite flexible in meaning. For example, the verb *noted* might be used as an explicit verb (representing statement) and also evidence-based/data driven (representing knowledge). Figure 1 depicts 15 categories of verbs across three typologies (i.e., representing statement, representing cognition, and representing knowledge or action) based on the strength of verb and variation of meaning. As seen in Figure 1, with regard to the scale from weaker in emphasis verbs to stronger in emphasis verbs, each verb additionally offers a slight variation of meaning.

Identifying Appropriate Verb Usage

According to the *Publication Manual* (APA, 2010), empirical studies are reports of original research wherein they include secondary analyses that test hypotheses "by presenting novel analyses of data not considered or addressed in previous reports" (p. 10). Typically, empirical studies consist of distinct sections to reflect various stages of the research process in the following sequence: (a) introduction, (b) method, (c) results, and (d) discussion (APA, 2010). The introduction section pertains to the development of the problem under investigation, and includes a history (e.g., literature review) and statement of the purpose of the investigation (APA, 2010, p. 10). Verbs that align with and are consistent with a specific step of the research process (e.g., introduction, method, results, discussion) we labeled as *primary verbs*. In contrast, we labeled *secondary verbs* as those verbs that might or might not directly align with a particular step of the writing process, the purpose of the research, and the methods used. Thus, verbs *representing statement* (e.g., remarked, assumed, interpreted, characterized) would be appropriate for use in this section and are considered primary verbs, and *verbs of cognition* (e.g., discerned, surmised) might be appropriate for introducing or describing the problem under investigation, and may or may not be necessary in the introduction section and are, therefore, referred to as secondary verbs. Table 4 illustrates the four sections of empirical research reports and examples of the primary and secondary verb categories that could be used accordingly.

Implications

According to Meyer (1997), an integral relationship exists to the process of investigation and the writing process—the two "are more closely bound up with each other than in the usual case where ordinary human activities are reported or narrated" (p. 58). As a result, the research process is "indistinguishable from and virtually coextensive with the process of writing" (Meyer, 1997, p. 59). Across academic disciplines, writing for publication is a critical factor for sustaining or advancing an academic career (Antoniou & Moriary, 2008; Chishom, 2007; McGrail, Rickard, & Jones, 2006). In an analysis of 11 prominent journals in the field of special education, and from 1988 through 2006, Mastropieri et al. (2009) concluded that research articles represent the largest category of publications. With respect to writing style, Henson (2007) listed 37 education journals and noted that more than 60% requested that authors adhere to the *Publication Manual* (APA, 2010), and recommended a personal writing program for researchers and authors that includes personal and professional writing goals.

Considering the importance of the writing process as directly linked to the dissemination of research findings through empirical articles, authors might utilize the *Typology Lists of Verbs for Scholarly Writing* to clarify their writing purposes better through an accurate textual context. In addition, authors might consider the use of the *Typology Lists of Verbs for Scholarly Writing* when writing for publication with respect to conceptual and methodological articles. In any case, we hope that our present editorial will motivate authors to recognize the importance of using appropriate verbs to maximize meaning and clarity in writing.

Table 1

Typology of Verbs Representing Statement for Scholarly Writing

Explicit Verbs	Implicit Verbs	Inclusive
remarked	speculated	comprised
noted	assumed	consisted of
commented	explained	contained
mentioned	argued	included
documented	associated	characterized
affirmed	reinforced	categorized
pronounced	suggested	labeled
asserted	interpreted	involved
declared	implied	
reported	considered	
discussed		
addressed		
summed		
acquiesced		
conceded		
suspected		
predicted		
stated		
defined		
indicated		
ascertained		
bracketed		
outlined		
advised		
cautioned		
admonished		
delineated		
operationalized		
addressed		
excoriated		
specified		
described		

Note. The list of verbs in this table is by no means exhaustive.

Table 2

Typology of Verbs Representing Cognition for Scholarly Writing

Comparison Verbs	Verification Verbs	Interpretation Verbs	Cognitive Process Verbs	Reference Verbs	Perception Verbs	Proposition Verbs
distinguished	established	inferred	believed	consulted	engendered	posed
compared	corroborated	learned	thought	attested	perceived	instituted
contrasted	verified	concluded	identified	decided	felt	established
differentiated	confirmed	ascertained	recognized	summarized	alluded	maintained
discriminated	established	investigated	discerned	synthesized		formalized
triangulated	attested	realized	scrutinized	expected		established
represented	designated	distinguished	realized	represented		hypothesized
agreed	required	interpreted	noticed	necessitate		reviewed
acquiesced	endorsed	determined	reasoned			surmised
varied	validated	deduced	enlightened			speculated
attenuated	supported	surmised	opined			conjectured
reduced	substantiated	realized				posited
	acknowledged	represented				put forward
		factored				associated
		grouped				nominated
		clustered				postulated
		subdivided				construed
		contended				proposed
		unraveled				provided
		estimated				initiated
						guided
						theorized
						gleaned
						derived
						debunked
						framed
						demanded
						highlighted

Note. The list of verbs in this table is by no means exhaustive.

Table 3

Typology of Verbs Representing Knowledge or Action for Scholarly Writing

Evidence-Based/Data Driven Verbs	Procedural Verbs	Visual Verbs	Direct Object Verbs	Creation Verbs
found	adapted	exhibited	gathered	crafted
embarked	analyzed	displayed	collected	originated
encountered	examined	graphed	composed	generated
noted	performed	illustrated	sampled	synthesized
revealed	conducted	presented	randomized	engendered
detected	undertook	mapped	chose	stimulated
tested	consulted	depicted	selected	instituted
discovered	scrutinized	represented	elected	constituted
traced	consented	elucidated	developed	theorized
observed	originated		contrived	established
documented	composed		modeled	developed
experienced	produced		provided	maintained
uncovered	conceptualized		procured	devised
extracted	consulted		preferred	invented
demonstrated	reviewed		adopted	devised
showed	evaluated		provided	expanded
emerged	contrived		sampled	
surfaced	investigated		randomized	
appeared	obtained		extended	
	connected		used	
	applied		utilized	
	built		employed	
			expanded	
	sought			
	examined			

Note. The list of verbs in this table is by no means exhaustive.

		Weakest Level	Intermediate Level		Strongest Level
Representing Statement	*Explicit Verbs*	indicated mentioned	stated		declared pronounced
	Implicit Verbs	speculated			assumed
	Inclusive Verbs	included	characterized		contained comprised
Representing Cognition	*Comparison Verbs*	compared contrasted			discriminated
	Verification Verbs	triangulated			confirmed verified
	Interpretation Verbs	inferred	realized		concluded
	Cognitive Process Verbs	thought	believed		noticed
	Reference Verbs	consulted	summarized		expected
	Perception Verbs	(no obvious hierarchy)			
	Proposition Verbs	speculated	hypothesized		established
Representing Knowledge	*Evidence-Based/Data Driven Verbs*	noted	observed found		documented experienced
	Procedural Verbs	reviewed	consulted		scrutinized
	Visual Verbs	(no obvious hierarchy)			
	Direct Object Verbs (Stages in Research Process)	sampled			provided
	Creation Verbs	crafted originated			developed

Figure 1. Strength of the verb and variation of meaning.

Table 4

Examples of the Categorical Use of Verbs (Primary and Secondary) for Academic Discourse

Section of Article	Category of Verb
Introduction/Literature Review Section	*Verbs representing statement* 　Explicit Verbs (primary) 　Implicit Verbs (primary) 　Inclusive Verbs (secondary) *Verbs representing cognition* 　Proposition Verbs (secondary) 　Referenced Verbs (primary) 　Cognitive Process Verbs (secondary)
Method Section	*Verbs representing knowledge or action* 　Creation Verbs (primary) 　Procedural Verbs (primary) 　Direct Object Verbs (primary) 　Procedural Verbs (primary) 　Visual Verbs (secondary) *Verbs representing cognition* 　Comparison Verbs (secondary)
Results Section	*Verbs representing knowledge or action* 　Evidence-based /Data-driven Verbs (primary) 　Procedural Verbs (primary) 　Visual Verbs (secondary) 　Direct Object Verbs (secondary) *Verbs representing cognition* 　Perception Verbs (primary) 　Verification Verbs (primary) 　Comparative Verbs (secondary)
Discussion Section	*Verbs representing cognition* 　Proposition Verbs (secondary) 　Interpretation Verbs (primary) 　Reference Verbs (primary) 　Cognitive Process Verbs (secondary)

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