ON THE ROLE OF GESTURES IN THE COMPREHENSION OF PHRASAL VERBS AND IDIOMATIC EXPRESSIONS IN ENGLISH
A case study comparing the performance of learners with and without dyslexia

SILVIA MASI, GIANMARCO VIGNOZZI[1]
UNIVERSITÀ DI PISA

Abstract – This contribution focuses on the role of spontaneous gestures in the comprehension of co-occurring phrasal verbs and idiomatic expressions by learners of English as a foreign language. The hypothesis at the basis of the work is that iconic gestures may assist in the understanding of semantically opaque expressions not only learners with typical development, but also learners with developmental dyslexia, who tend to have greater difficulty in processing figurative language and pragmatic meanings. An experiment was run covering 11 not-fully compositional verbs and non-transparent idioms as linguistic stimuli accompanied by iconic and metaphoric gestures, which were taken from authentic audio-visual materials. Two groups of Italian students, with and without dyslexia and consisting of 23 members each, from undergraduate courses at the University of Pisa were recruited for the experiment. Each student was exposed to the same stimuli via two different modes, namely audio and video, following different orders of presentation. The results seem to support the initial hypothesis, as highlighted by the better performance elicited through the visual mode where gestures were clearly visible, especially when learners with dyslexia were involved. Consequently, the study provides evidence in favour of a multimodal orientation and use of correlated strategies in the learning/teaching of English as a foreign language in general, and even more so when learners with dyslexia are present.

Keywords: Idiomatic expressions; phrasal verbs; language comprehension; multimodal literacy.

1. Introduction

This paper aims to cast light on the potential contributions of unprompted gestures co-occurring with opaque idiomatic expressions and phrasal verbs for their comprehension by non-native learners of English as a foreign language.

Speech formulas, such as idioms and phrasal verbs, are key elements to prompt fluency in English learners' production, and their understanding is vital to ensure smooth and effective communication (Gibbs 2012; Wood 2019; Wray

---

[1] Although the research was carried out jointly by the two authors, Silvia Masi wrote sections 3, 4, 6 and 7, and Gianmarco Vignozzi wrote sections 1, 2, and 5.

2002). Despite being natural and extremely common fixed expressions for English native speakers, idioms and phrasal verbs are often perceived as a source of difficulty and distress by non-native learners. This is especially the case when the meaning of these expressions is completely idiomatic, i.e., when it is non-transparent and does not correspond to the sum of the meanings of the single lexemes. If such difficulties in decoding the meaning-making of opaque expressions are true for typically-developing students (Cacciari, Corradini 2015; Siyanova-Chanturia *et al.* 2011), studies have shown that students with developmental dyslexia face particular challenges when processing these instances of non-literal language (cf. *inter alia* Cappelli, Noccetti 2016; Cardillo *et al.* 2018; Griffiths 2007).

Since some gestures, and in particular the iconic and metaphoric ones, tend to represent entities and ideas expressed through speech, we decided to investigate whether they could have a role in easing learners' decoding of semantically complex expressions such as idioms and phrasal verbs.

By relying upon an experimental study conducted on Italian learners of English with and without developing dyslexia from the University of Pisa, our research aims to answer the following broad research question:

- Can students with and without dyslexia take advantage from gestures accompanying idiomatic expressions and phrasal verbs, thus showing gesture potential to help decode their meaning?

The article is divided into seven sections. Section two introduces the concept of formulaic language and reviews some of the most relevant studies on English idioms and phrasal verbs. Section three presents gesture studies and gives information about their communicative functions and potentials in discourse. In section four the experimental test at the basis of this research is carefully described and exemplified. Results are then gathered and assessed in section five and critically wrapped-up in sections six and seven.

2. Formulaic language, phrasal verbs and idioms

Idiomatic expressions and phrasal verbs pertain to the wide category of formulaic language, i.e., "multiword language phenomena which holistically represent a single meaning or function and are likely mentally stored and used as unanalysed wholes, as are single words" (Wood 2019, p. 30). In other words, formulaic expressions are recurrent word strings whose meaning is not necessarily the result of a word-by-word reading, but it is often attached to the formula as a whole. They are, therefore, ready-to-use in the mental lexicon of the speaker and not necessarily generated by language grammar rules.

Formulaicity is widely acknowledged to play a pivotal role in language production and this is especially true for the English language (Barlow 2011). In

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English: A case study comparing the performance of learners with and without dyslexia

73

fact, Erman and Warren (2000) claim that formulaic sequences make up to over 50% of English native speakers' language production and Conklin and Schmitt (2012) maintain that at least one-third to one-half of English spoken conversation is composed of formulaic elements.

Psycholinguistic research, in particular, has found out that the usage of formulaic language is a key element to speech fluency. Indeed, these fixed sequences act as mental shortcuts that contribute to avoid processing overload in native speakers and hearers, as well as in second language learners (cf. *inter alia* Cacciari, Tabossi 1988; Gibbs 2012; Wood 2015, 2019; Wray 2002, 2008).

Classifying the different linguistic phenomena ascribable under the umbrella term of formulaic language is quite challenging as the boundaries among the categories are often blurred. On the basis of recurrent structural, semantic, syntactic or pragmatic regularities, Wood (2019, p. 31) upholds that the "main categories of [formulaic language] are collocations, idioms, lexical phrases, lexical bundles, metaphors, proverbs, phrasal verbs, n-grams, conc-grams, and compounds". In this contribution we focus in particular on idioms and phrasal verbs, which, apart from being among the most wide-spread instances of formulaic language, share a similar semantically opaque and non-compositional nature. Indeed, figuration is what makes their meaning particularly challenging especially for learners of English as a second language with or without special needs (Cacciari, Corradini 2015; Siyanova-Chanturia *et al.* 2011).

Given their limited flexibility (Moon 1998), the institutionalised and non-transparent nature of their meaning (Fernando and Flavell 1981; Glucksberg 2001), and the fact that they are stored and processed holistically as chunks (Wray 2002), idiomatic expressions are generally considered the most representative type of formulaic language in discourse (Wood 2019). Idioms could be defined as stable strings of words "that convey speaker meaning that cannot be determined by simply adding up the meanings of each word or morpheme" (Gibbs 2012), i.e., their meaning is non-compositional and non-literal; thus not easily intelligible to learners with a limited knowledge of the language.

Scholars in the field of semantics have proposed different scales or continuum of idiomaticity (cf. *inter alia* Fernando 1996; Fernando, Flavell 1981; Glucksberg 2001; Moon 1998) distinguishing between more transparent idioms, e.g., 'white lie', where the word 'white' has a figurative meaning and 'lie', instead, is connected to its literal meaning, and fully opaque idioms (e.g., 'it's a piece of cake'), whose meaning is totally figurative.

From the point of view of usage, applied research has found that idioms are not simply embellishments to language deployed as colourful stylistic items to enrich plain and literal language, instead they are used to express meanings in a vivid and straightforward manner through metaphoric conceptualizations (Cooper 1999). This can also have pragmatic implications as it may help being more indirect and polite when expressing subjective positive or negative

evaluations (Carter 1997) and could also facilitate sharing ideas that can be problematic to communicate using literal language (Gibbs 2012).

Phrasal verbs, intended as non-compositional constructions of lexical verbs and adverbial or prepositional particles (Quirk *et al.* 1985), such as 'make up' meaning 'to invent', share with idiomatic expressions a similar semantic opacity and constructional fixedness. As Quirk *et al.* (1985, p. 1152) noticed "the meaning of the combination manifestly cannot be predicted from the meanings of verb and particle". In fact, just as idioms, phrasal verbs seem to function as single syntactic units whose meanings are memorised holistically, separately from the meanings of the component words (Wray 2002; Wood 2019). As a consequence, they are considered by some scholars as particular kinds of idiomatic expressions (Jackendoff 1995).

The high frequency of phrasal verbs in English emerged in different empirical quantitative studies, such as in Celce-Murcia and Larsen-Freeman (1999) who defined them as ubiquitous in spoken interactions, and in Gardner and Davies (2007, p. 347) who estimated that "learners will encounter, on average, one [phrasal verb] in every 150 words of English they are exposed to".

Hence, the prevalence and usage of both idiomatic expressions and phrasal verbs makes it very important to recognise and to acquire them for learners in order to become fluent and proficient in English, as well as to be able to follow a conversation smoothly. Notwithstanding that, their complex nature makes it very difficult for non-native learners, being them typically-developing students or students with dyslexia, to grasp their meanings.

3. Some notes on gesture research

3.1. Gesture types and functions

The field of modern gesture studies can be traced back to the 1970s, when researchers from different disciplines started to converge on the view of gesture and speech as two aspects of the same process (McCafferty, Stam 2008). Since then, different classifications of gesture types and functions have been proposed (e.g., Kendon 2004; Lin 2017; McNeill 1985, 1992, 2005; Weinberg *et al.* 2013, *inter alia*), some of which are briefly referred to below.

While emblems are language-like, conventional gestures that depend on a given culture (as the 'thumb up' gesture for 'ok'), gesticulations are spontaneous, often unconscious and idiosyncratic. Among the most influential categorisations is McNeill's distinction into beats (quick movements occurring at the meta-level of discourse), iconics (representing concrete entities and actions), metaphorics (derived from concrete representations but illustrating abstract ideas), deictics (pointing gestures) and cohesives (tying together discourse material) (McNeill 1992). The categories were later revised, due to the highly polysemous and

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English: A case study comparing the performance of learners with and without dyslexia

75

multifaceted nature of gestural forms, in favour of more flexible dimensions (such as iconicity, metaphoricity and deixis, among others, see McNeill 2005; also see Wagner, Malisz, Kopp 2014) for their characterisation in a given context. Further research has indeed highlighted that gesture-speech relationships can have variable functions (e.g., reinforcing, integrating, supplementary, complementary and contradictory, see Lin 2017) and can also be studied in terms of groupings of gestures or gesture families (e.g., Fricke *et al.* 2014; Kendon 2004; Müller 2004). As for the multiple functions of gestures, in particular, taking stock of around forty-five years of research, recent evidence reviews and new experimental findings have underlined their pervasive dual role in communication from the perspectives of both the speaker/producer and the listener/viewer (Church *et al.* 2017). From the point of view of gesture production, gestures have, for example, been found to reduce cognitive load (Cook, Fenn 2017; Ping, Goldin-Meadow 2010). A single act of gesture can in fact be viewed simultaneously as a reflection of the speaker/producer's cognitive processes and as a facilitator of lexical access, information packaging and other operations for the benefit of the listener/viewer's understanding (Hostetter, Boncoddo 2017).

3.2. Neurobiological and psychological evidence

Neurobiological and psychological evidence has indeed shown the potential of gestures to provide a more transparent version of events than speech, on account of their use of space and time in a holistic format. Additionally, thanks to mirror neurons, sensorimotor areas that are active in the brain when performing an action are also triggered when a person observes someone else performing that action, and this may be applied to the role of gestures in language understanding too (Müller *et al*. 2013). As a result, seeing someone's gestures may also activate the sensorimotor system of the viewer in similar ways (Hostetter, Boncoddo 2017). Gestures can even enhance or expand speech and transform our thinking and communication accordingly (Church, Goldin-Meadow 2017). For example, they have been found to foster the expression of latent ideas, along with problem-solving strategies and inference-making (Nathan 2017).

The psychological tenet underlying much research is in fact that gestures are a reflection of our embodied cognition, i.e., they are motivated by our sensorimotor experiences, by our understanding of concepts as grounded in the way we physically interact with the world (cf. *inter alia* Alibali, Nathan 2007; Cook, Fenn 2017; Hostetter, Boncoddo 2017; McNeill 2005; Müller *et al*. 2013). More precisely, gestures may profile aspects of basic and spatial image schemas which have been shown to structure source domains underpinning conceptual metaphors (Mittelberg 2018), thus providing the backbone for the development of more complex conceptual structures and abstract meaning extensions. As a matter of fact, not only can gestures represent objects, concrete actions and spatial relations, but they may also anchor abstract concepts in the world. By making

them more tangible, gestures act as a bridge between internal cognitive processes and the external environment (Beaudoin-Ryan 2017).

3.3. Evidence from SLA

Experimental research on the role of gestures in second language acquisition and learning/teaching has globally confirmed that congruent co-speech gestures may help in the comprehension, retrieval, memorisation and overall learning of novel vocabulary items (cf. Gullberg, McCafferty 2008; Lazaraton 2004; Kelly *et al.* 2009; Lazaraton and Ishihara 2005; Littlemore 2009; Littlemore *et al.* 2012; Macedonia, von Kriegstein 2012; Macedonia *et al.* 2011; Straube *et al.* 2009; Taleghani-Nikazm 2008). Although there is extensive variation cross-culturally and cross-linguistically in the interpretation of gestures (cf. Brown 2000 in Lazaraton 2004), the latter (along with other visual cues) have also been acknowledged a clarifying role in the interpretation of ambiguous, culturally-dependent rhetorical devices such as metaphoric expressions in L2, especially when learners' linguistic level is weak, as their understanding of metaphor may rely on a more general conceptual framework represented through gestures (Kida 2008).

3.4. The learning/teaching of phrasal verbs and idioms and the potential role of gestures

Raising awareness of conceptual structure as a motivating factor for linguistic organisation has been the rationale behind a great deal of Cognitive Linguistics-oriented research on word polysemy and correlated proposals for applications to pedagogy. Crucially for the purposes of the present study, the learning and teaching of English prepositions/particles, phrasal verbs and idioms have received a lot of attention from this perspective.

On many accounts, the senses of polysemous particles are conceived of as forming a semantic network in which the origin of senses can be explained by virtue of their relation to others in the network and especially to the core one, which stems from the cognitive domain of concrete, physical space. This primary sense, that is, motivates the emergence of more peripheral abstract senses via different types of figurative extensions that, in time, become conventionalised through repeated use (cf. Tyler, Evans 2003).[2]

As for idioms, research has shown that the 'dead' imagery behind them can be easily revived by referring to underlying conceptual metaphors (as a synchronic motivation) or by tracing the idiom back to its literal origin

---

[2] For other relevant works, cf. Brugman, Lakoff 1988; Castillo 2017; Condon 2008; Dirven 2001; Holme 2009; Kartal, Uner 2017; Kurtyka 2001; Lakoff 1987; Lindner 1983; Lindstromberg 1998; Littlemore 2009; Mahpeykar, Tyler 2014; Masi 2011; Rudzka-Ostyn 2003; White 2012, *inter alia*.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
A case study comparing the performance of learners with and without dyslexia

77

(diachronic motivation), which may also help to evoke a picture of a concrete scene (cf. Boers 2001; Boers *et al.* 2007; Kövecses 2001, also cf. Abolfazli, Sadeghi 2017; Boers, Lindstromberg 2008; Lazar 2003; Skoufaki 2005;, *inter alia*).

A widely shared aspect of all this literature is the valuable contribution of an array of visual cues as modes of presentation used for explanatory and learning purposes, viz. static schematic representations and pictorial illustrations, but also moving images and audiovisual aids (cf. Takahashi, Matsuya 2013), role-plays and movies (in the teaching of idioms, cf. Abolfazli, Sadeghi 2017). Gestures have been broached too (Littlemore 2009, and esp. cf. Holme 2009 for suggestions on their use to grasp the different senses of some prepositions), although, as far as we know, their plausible effectiveness as an enhancement strategy for the understanding of phrasal verbs and idioms largely remains to be ascertained from an experimental point of view, especially as far as their possible impact on learners with dyslexia is concerned.

4. Research hypotheses and assumptions

In previous research on the role of gestures in different multimodal genres for the development of multimodal literacy in ESP teaching (see Masi 2016, 2019, 2020 on TED Talks; Vignozzi 2016, 2019 on animated movies and on TV interviews)[3], it was indeed noticed that in several cases they tended to meaningfully represent objects, dynamic actions and/or spatial relations as concrete bases standing for the non-compositional, abstract meanings of some English phrasal verbs and idioms. Inspired by the evidence on gesture functions and effects briefly presented in the preceding overview, we hypothesised that 1) they may enhance the salience and transparency of such notoriously problematic vocabulary items via reification, and that 2) they may do so not only for the benefit of students of English in general, but also for learners with developmental dyslexia in particular, as the latter have been found to especially take advantage from a multimodal presentation of vocabulary input (Cappelli, Noccetti 2016; Noccetti, Cappelli 2018). Indeed, authentic multimodal input for stimuli presentation can provide a useful basis for studying any type of communicative behaviour in order to improve that behaviour and our understanding of the underpinnings of multimodal literacy (see for example Bonsignori *et al.* 2022 and Bonsignori, Crawford Camiciottoli 2016). We thus embarked on a small pilot experimental study to verify the validity of such hypotheses.

The objection may be raised that cross-cultural and cross-linguistic variation in the use of gestures is a possible argument against our hypotheses, as

---

[3] Audio-visual genres are in fact being exploited more and more in language instruction (cf. Bonsignori, Crawford Camiciottoli 2016; Crawford Camiciottoli, Bonsignori 2015; Takaesu 2013, *inter alia*).

gestures may actually reflect different cultural-historical conceptualisations of the world (McCafferty 2008). However, research has also shown similar preferences of gesture-speech production by speakers despite different cultural and linguistic backgrounds (Lin 2017). In fact, we did not take into account cross-cultural differences in this first stage, and we assumed the following: 1) nonverbal modes of communication are more universal in the form-meaning relationship than those relationships are in speech; 2) a great deal of gestures are motived by highly shared basic conceptual structures and cognitive-semiotic processes grounded in nature; 3) continuous exposure to multiple media inputs where English is pervasively available, also as a lingua franca (Hanamoto 2017) in an ever more interconnected global community, may be responsible for an increasingly generalised internalisation /or even reduction of differences, with correlated heightened cross-cultural meaningfulness and a clarifying potential of some such conceptualisations.

4.1. Test design and methodology

In order to verify our hypotheses, eleven stimuli (i.e., eight phrasal verbs and three idioms) with not fully transparent meanings and accompanied by metaphoric and iconic gestures (McNeill 1992) were taken from the preceding multimodal research mentioned above.[4] Two groups of informants were selected, one consisting of Italian learners of English with developmental dyslexia (henceforth referred to as Dys)[5], and the other of Italian learners of English with typical development (henceforth referred to as CG for control group). Each comprised twenty-three students from nineteen to twenty-five years of age, all enrolled in different degree programmes at the University of Pisa.[6]

The test methodology was inspired by relevant experimental studies based on the manipulation of the presence/absence of gesture (Church *et al*. 2017), as research has shown that, when processing speech, manipulation results in altered brain activity (Kelly 2017). Thus, each informant was exposed twice to the same stimuli, which were presented by means of both short audio clips and videos (in which significant co-speech gestures were visible). Also, each group of students was further divided into two subgroups (Dys 1 and 2; CG A and B), in which questions had an alternate distribution depending on modes, in order to verify the effect of different combinations of mode presentation on learners' performance. In other words, stimuli presented first through audio clips and then through videos in Dys 1 followed a reversed order – first via video, then via audio – in Dys 2, with the same pattern applied to CG A and B.

---

[4] See Masi 2016, 2019, 2020, Vignozzi 2016, 2019.

[5] All of them had been officially diagnosed with the condition, as confirmed by the Disability Office of the University (Ufficio Servizi per l'Integrazione di studenti con Disabilità - USID).

[6] They came from different secondary schools and had, on average, a lower-intermediate level of English.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English: A case study comparing the performance of learners with and without dyslexia

79

The test was run on the 'Moodle' University platform (https://elearning.humnet.unipi.it/), was timed for 35 minutes, had the format of multiple-choice questions (with one question per page), except for the first, which was aimed at ascertaining the informants' possible prior knowledge of the target items. A last question was included to elicit informants' feedback on their impressions on the extent to which the audiovisual mode had helped them identify the correct options.[7] Below is a screenshot of such 'diagnostic' question (Figure 1), which also presents the list of the target expressions of the experiment (the latter are in the infinitive form, although they were often in the past in the actual clips):
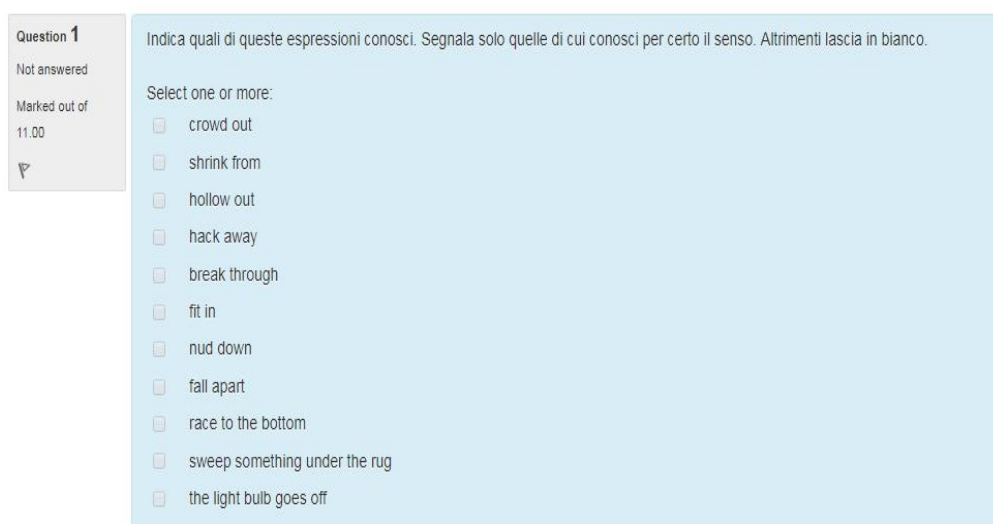

Question **1**	Indica quali di queste espressioni conosci. Segnala solo quelle di cui conosci per certo il senso. Altrimenti lascia in bianco.
Not answered	
Marked out of 11.00	Select one or more:
	☐ crowd out
	☐ shrink from
	☐ hollow out
	☐ hack away
	☐ break through
	☐ fit in
	☐ nud down
	☐ fall apart
	☐ race to the bottom
	☐ sweep something under the rug
	☐ the light bulb goes off

Figure 1
Screenshot of question 1 in the test.[8]

As can be seen from the list, a pseudo verb (*nud down*) was also part of the experiment, and was accompanied by a metaphoric gesture (compatible with *down*) intuitively guiding interpretation, while an existing phrasal verb (*fall apart*) was synchronised with a counterintuitive gesture – in a clip of our own construction – so as to verify the impact of incongruent or conflictual information on our informants' performance, especially on the Dys group's (cf. Section 4.1 and 4.2). Indeed, neurological evidence has shown that the brain expects gesture information to coordinate with speech (Kelly 2017), and experimental studies have also found that gestures conveying information that is incongruent or in

---

[7] Approximate translation of instructions in the question: In the test, did the video clips help you understand the meanings of the expressions in bold type? Answers options: yes, sometimes; never; always, not very much.

[8] Approximate translation of instructions in the question: Indicate the expressions that you are familiar with. Select only those you know for sure. Do not select anything in case the expressions are not familiar.

conflict with the information conveyed in speech can hinder understanding (Kelly *et al*. 2004).

By way of illustration, below are two sample questions from the test, with screenshots from the videos. The first (Figure 2) includes the representation of one phrasal verb, i.e., *fall apart,* accompanied by a presumably incongruent gesture of both hands converging at the centre, in front of the speaker, rather than moving out and away in opposite directions, which would have been a more congruent representation of two people going separate ways after the end of their relationship. The second (Figure 3) relates to the idiom *light bulb goes off*, with the speaker's hand opening next to his head to represent the bulb that lights up as an idea suddenly comes to his mind.

Example 1: They tried to save their marriage by going to therapy. In the end, it fell apart anyway.
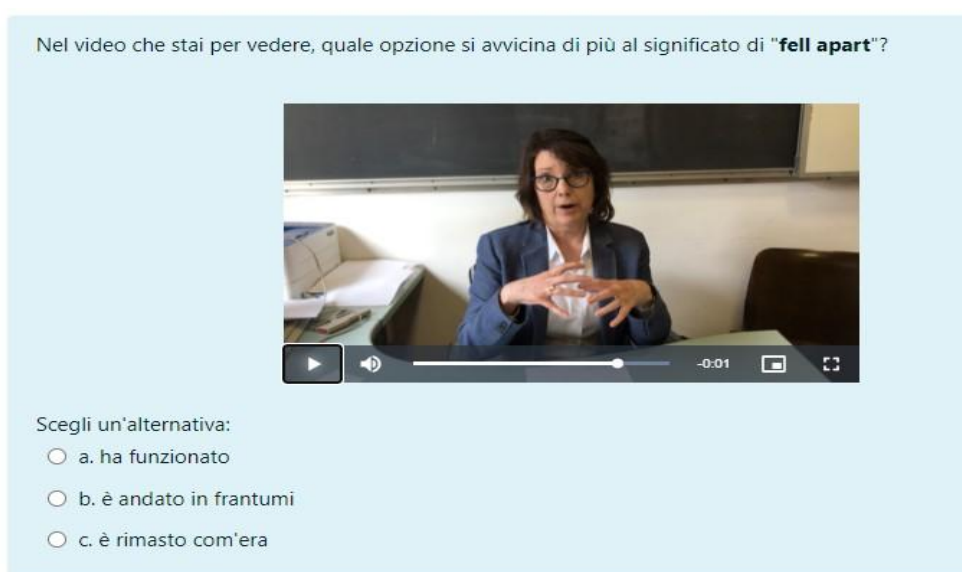

Figure 2
Screenshot of question with video for *fell apart* and incongruent gesture.[9]

---

[9] Approximate translation of instructions and of options: In the video clip you are about to watch, which of the options given below best captures the meaning of 'fell apart'? a. worked, b. was shuttered, c. stayed the same.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
A case study comparing the performance of learners with and without dyslexia

81

Example 2: When on my trip, the product worked so well that the light bulb went off.

Figure 3
Screenshot of question with video for *the light bulb went off.*[10]

Even though context plays an important role in meaning disambiguation, the length of samples was kept to a minimum (ten to fourteen seconds) in the attempt to exclude the possible contribution of other linguistic cues as much as possible and better appreciate the effect of co-verbal gestures alone.

5. The results of the test

The analysis of the results of the test started off with the evaluation of the overall performance of the two groups of participants, i.e., Dys and CG, in recognizing the meaning of the idiomatic expressions and the phrasal verbs presented in the test. Figure 4 shows the percentages of correct and incorrect answers in recognizing the meanings of the stimuli in the two groups.
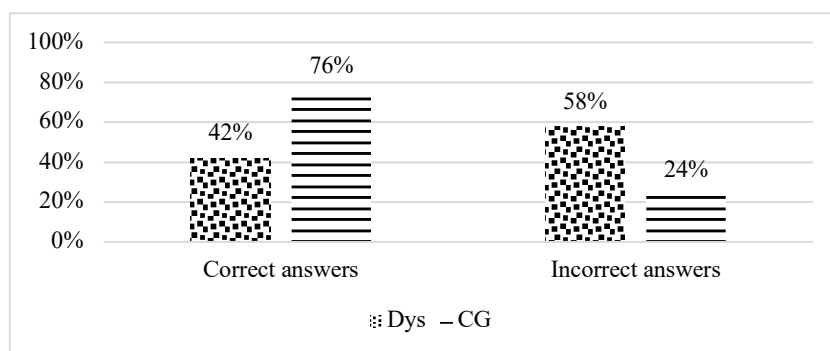

Figure 4
Overall test performances.

[10] Approximate translation of instructions and of options: In the video clip you are about to watch, which of the options given below best captures the meaning of 'the light bulb went off'? a. I forgot, b. I had an idea, c. I unplugged myself (mentally).

On a surface level, we can notice that the CG gave more correct answers than the Dys group (76% the former and 42% the latter). Such a result is perfectly in line with the studies carried out by Cappelli and Noccetti (2016) and Noccetti and Cappelli (2018) that bring to the fore the difficulties of processing and understanding figurative language and pragmatic meanings for dyslexics in particular.

If we observe more in detail whether correct answers are paired either with auditory or with audiovisual stimuli, it emerges that both groups were more likely to answer correctly when assessing audiovisual stimuli (Figure 5). This suggests that the audiovisual stimulus is more easily intelligible both for Dys students and for the CG.
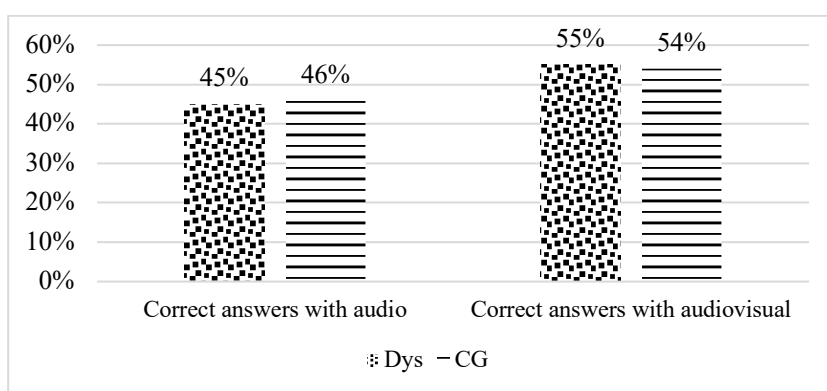

Figure 5.
Correct answers with audio and audiovisual stimuli

After considering the overall performances of the two groups, we attentively assessed the combinations of the response patterns in relation to the modes of presentation of the stimuli as well as their order of administration: either auditory first and then audiovisual or the other way round. This should help to evaluate possible performance divergences triggered by the different semiotic modes involved in the retrieval of the meaning.

Regardless of the order of administration of the stimuli, in both groups there were several pairs in which the answer to the audiovisual stimulus was correct while the one to the auditory stimulus was incorrect (hereafter 'Type 1' sequences) (Figure 6). Type 2 sequences, instead, comprised audiovisual mode with correct answers followed by the auditory one featuring again a correct answer. Hence, the good performance in the auditory mode could depend, at least in part, on the positive influence of the preceding audiovisual input. Both Type 1 and Type 2 appear to be compatible with our hypothesis about the potentially beneficial effect of the audiovisual input to discern the meaning of the idiom or the phrasal verb they had to evaluate.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
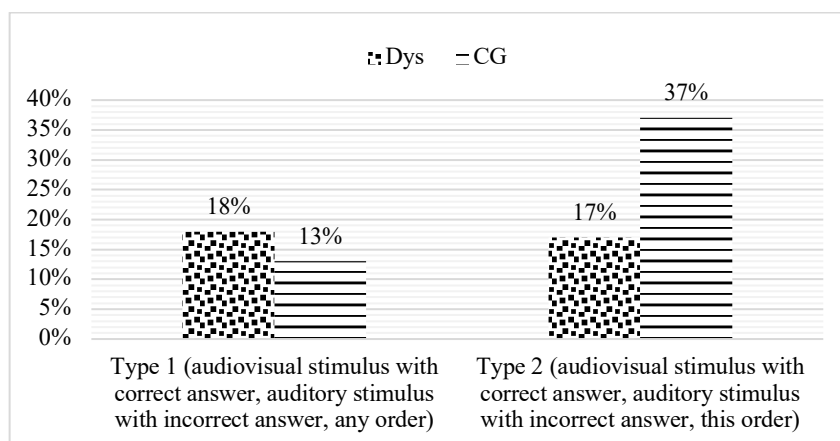A case study comparing the performance of learners with and without dyslexia

83

Figure 6
Sequences of answers: Type 1 and Type 2.

In more detail, the results for the sequence of modes of presentation displayed in Type 1 seem to confirm the preference students with dyslexia have for the audiovisual stimulus. In 18% of cases, they gave the correct answer when presented with the audiovisual stimulus but the incorrect one when evaluating the auditory alone, as compared to the control group for which the same condition occurred in 13% of cases. On the contrary, the CG more often had both answers (Type 2, first to the audiovisual then to the auditory stimulus) correct (37% as compared to 17% for Dys).

If the modes illustrated in Type 1 and Type 2 seem to support the effectiveness of the audiovisual input to decode the meaning of idioms and phrasal verbs, other sequences of answers seem to privilege the influence of the auditory stimulus. In some cases, in fact, we noticed counterintuitive combinations (hereafter Type 3 sequences) with respect to the starting research hypothesis. Counterintuitive combinations are those in which the auditory stimulus corresponds to the correct answer and the subsequent audiovisual stimulus to the incorrect answer, as if the video had confused students' ideas or had been misinterpreted. Finally, two last combinations that could be detected are the one featuring a correct response associated with the auditory stimulus, followed by an equally correct response with the audiovisual stimulus (hereafter 'Type 4') and another with incorrect answers both to the audiovisual and the auditory stimulus, no matter the order of presentation (hereafter 'Type 5'). Figure 7 showcases the percentages of the modes of presentation in Type 3 and Type 4 sequences in the two groups.
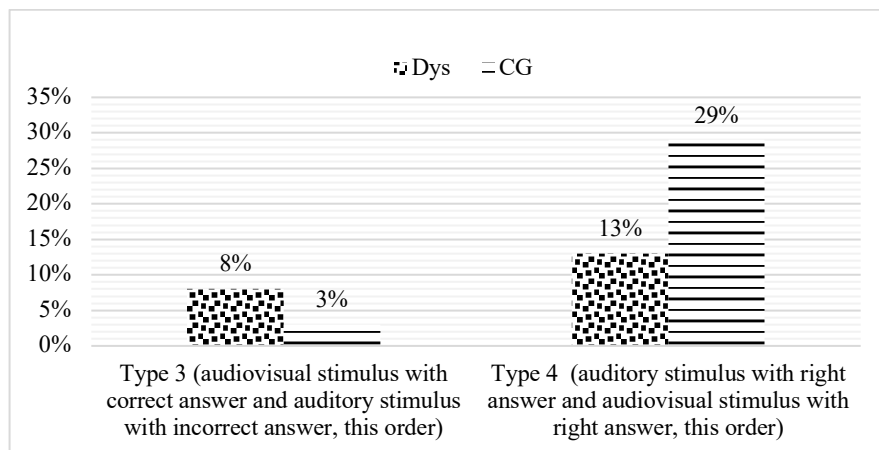
Figure 7
Sequences of answers: Type 3 and Type 4.

Quantitative data indicate that the CG gave fewer counterintuitive answers (Type 3) and overall performed better than the students with dyslexia when the auditory stimulus preceded the audiovisual one (Type 4). However, this trend could also suggest their deeper previous knowledge of the idiomatic expressions and phrasal verbs presented in the test. This aspect could be verified by evaluating the answers given to question 1, in which we asked the informants to specify which of the stimuli presented they already knew.

5.1. The case of "nud down"

A case that deserves to be mentioned separately is that of *nud down*, a pseudo phrasal verb that we created *ad hoc* to test whether the audiovisual stimulus would lead the students to attach to it the meaning triggered by the visual mode. In fact, in the video the speaker uses a metaphoric gesture, synchronised with the verb, in which the speaker moves something away from herself and towards the outside. This gesture should be explanatory of the meaning that we intended as the correct one in the test, i.e., to drive away. In other words, the stimulus was crafted to intuitively guide the informants' interpretation towards the correct answer.

If we evaluate the answers given to this particular stimulus, it is interesting to notice that the group of students with dyslexia gave more correct answers in correspondence to the audiovisual stimulus than the CG. Figure 8 puts together the figures for Type 1 and Type 2 sequences for this particular stimulus.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
A case study comparing the performance of learners with and without dyslexia
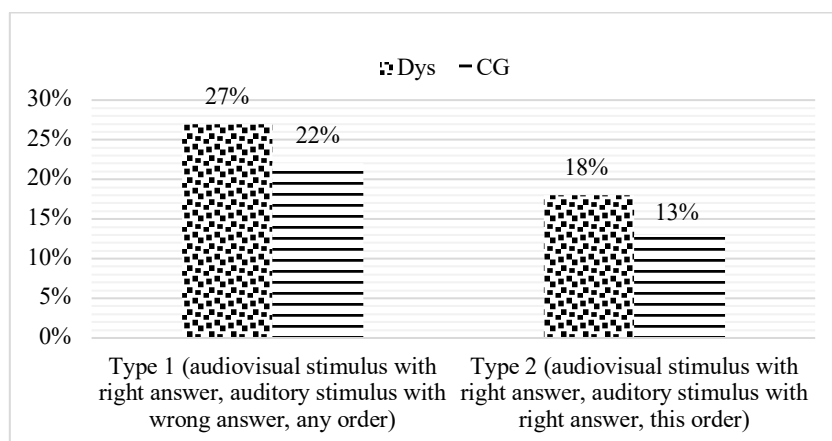
85

Figure 8
Type 1 and Type 2 sequences of answers for *nud down*.

In 27% of cases the students with dyslexia recognised the meaning of the pseudo phrasal verb when exposed to the audiovisual stimulus but not when assessing the auditory stimulus alone,[11] as compared to 22% for the CG. If we look at the performances in the sequences of answers with the correct answer with the audiovisual and the correct answer with the subsequent auditory stimulus (Type 2), a similar trend was observed for the Dys group, who featured 18% of these sequences vs. 13% for the CG. Therefore, these results seem to strengthen our starting hypothesis and the results discussed above according to which especially the group of students with dyslexia relies on the audiovisual stimulus to derive the meaning of unknown expressions.

5.2. The case of "fall apart"

Another case that is worth mentioning is that of *fall apart*, a phrasal verb meaning *to shatter* for which an audiovisual stimulus with a counterintuitive gesture was created. In fact, in the video the hands and the arms of the speaker converge towards the centre in front of her. To put it simply, the aim of this stimulus was to assess the misleading effect of a gesture that would metaphorically point to a wrong meaning. The pie charts below (Figure 9 and Figure 10) summarise the performances of the two groups for this stimulus.

---

[11] This percentage refers to 'Type' 1 sequence of answers, for which the correct answer for the audiovisual stimulus and incorrect one for the auditory are considered in any order of appearance.
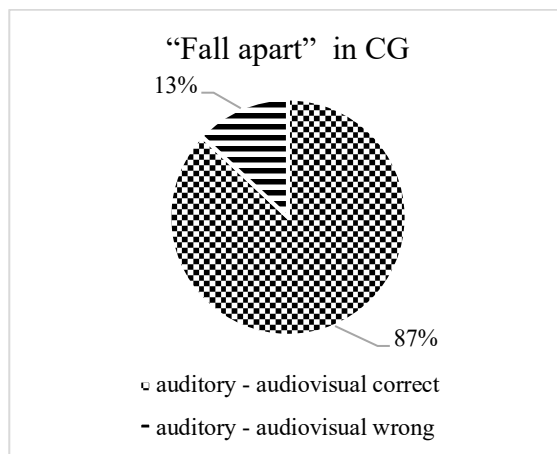
"Fall apart" in CG

13%

87%

- auditory - audiovisual correct
- auditory - audiovisual wrong

Figure 9
Fall apart CG.

"Fall apart" in Dys

4%

13%

26%

57%

- auditory - audiovisual video correct
- auditory - audiovisual wrong
- auditory correct - audiovisual wrong
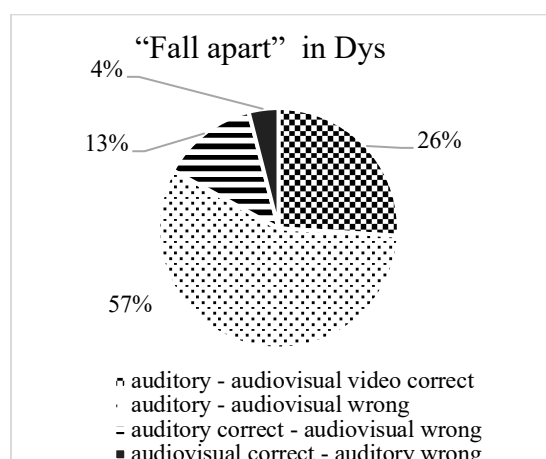- audiovisual correct - auditory wrong

Figure 10
Fall apart Dys.

In the Dys group, in most cases there are combinations of incorrect answers both to the auditory and to the audiovisual stimulus (57% of cases, regardless of the order of presentation of the sequences). Moreover, there are also some cases of correct answer associated with the auditory stimulus and incorrect answer with the audiovisual one (13%). These results could lead to infer that when the prior knowledge of the lexical item is lower, as testified by answers to question 1 (cf. Section 4) the misleading visual input creates confusion and leads to wrong interpretations. The CG overall performed better with 87% of correct sequences of answers. Differently from the Dys group, none of them got confused by the misleading video. Such a result could suggest both a better prior knowledge of the meaning of the phrasal verb and a lower attention for what is suggested by the visual mode.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
A case study comparing the performance of learners with and without dyslexia

87

6. Discussion and wrap-up

Among the expected results from this case study is surely the better performance of the CG (cf. Figure 4). The latter has also emerged from a lower degree of completely incorrect sequences of answers independently of the order of mode administration, viz. 18% vs 44% for the Dys group (cf. Type 5 in Figure 11 that summaries all our Types below).

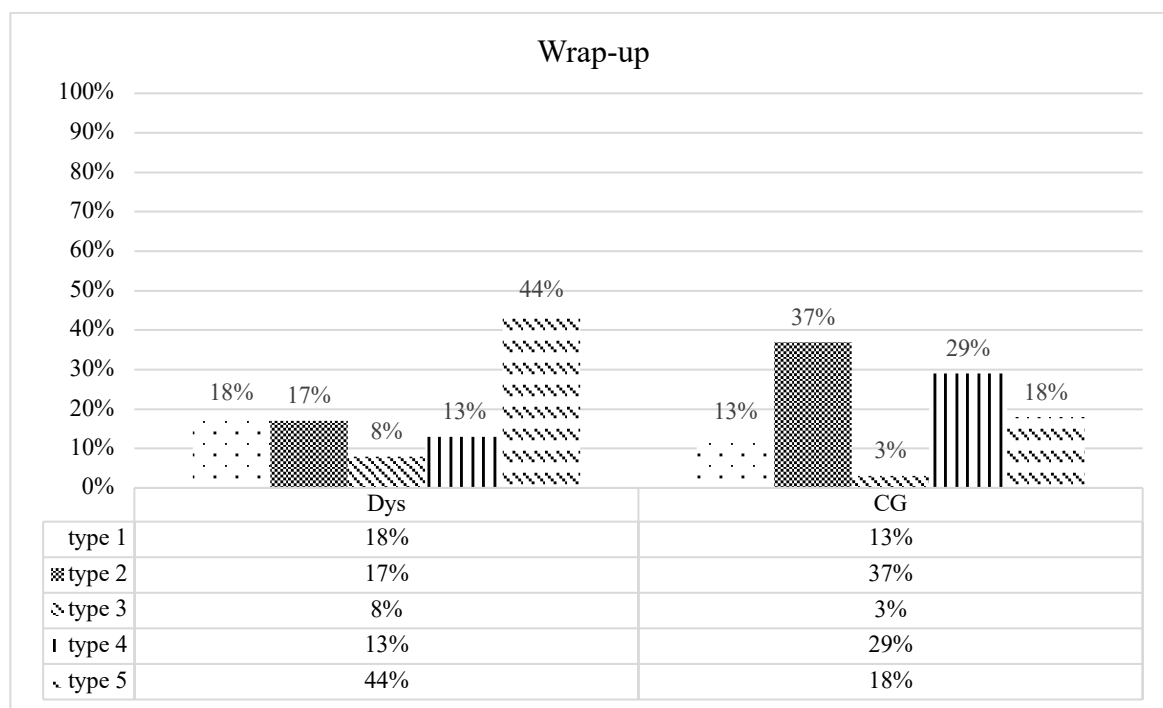|	Dys	CG
type 1	18%	13%
type 2	17%	37%
type 3	8%	3%
type 4	13%	29%
type 5	44%	18%

Figure 11
Summary of all Types involved in the study.

More significantly, the fact that the audiovisual stimulus was more intelligible than the audio both for Dys students and for the CG (with over 50% of correct answers in each group, see Figure 5) appears to confirm the validity of our first hypothesis, i.e., gestures captured in video clips may actually enhance the salience and transparency of problematic vocabulary items such as phrasal verbs and idioms via reification. Furthermore, of all the Types taken into account in the study, Type 1 (sequences with correct answers only when the stimulus was presented via audiovisual mode, independently of order of mode administration) appears as the most revealing as far as our second hypothesis was concerned, namely that gestures captured in video clips may be especially beneficial for learners of English with developmental dyslexia (see Figure 6). More data, gathered from a higher number of informants in both groups, would be necessary to further verify the validity of these results, along with a more stringent control of informants' prior knowledge of the targeted expressions.

In fact, the first diagnostic question in the test gave us some information on students' own evaluation of their prior knowledge of the expressions (which had to be selected from a list), with higher vocabulary skills predicted by the learners in the CG. However, informants' actual performance, together with data from the last feedback question on their perceived helpfulness of the video clips – which had 'yes, sometimes' as the most frequent answer, often displayed incongruent results with initial predictions. This suggests that the perception of learners' passive vocabulary knowledge cannot be trusted in full.

Although difficult to determine, knowing for sure whether an informant is already familiar with a given target expression would allow for the isolation of the role and better appreciation of the impact of mode of stimulus administration in other Types of sequences from the study. For example, it would enable us to determine whether the results of the correct interpretation of audio input in Type 2 sequences (preceded by correct interpretation of video input, see Figure 6) were actually prompted by the audiovisual mode or were rather influenced by better prior knowledge. The former case might apply to our Dys group, who generally evaluated their prior knowledge of items as lower than the CG, while the latter might be possibly true of CG students, who predicted higher vocabulary skills to start with. This interpretation would also comply with their good performance when audio stimuli preceded audiovisual ones, see Type 4 in Figure 7).

A selection of more homogeneous stimuli in terms of transparency – not only of expressions but also of gestures depicting them – would be necessary too. The stimuli that were easier to understand by Dys (that is, which received the highest number of correct answers by informants in this group) consisted of more iconic and / or transparent configurations, e.g., *hack away*, accompanied by the gesture of the speaker imitating the action of typing on a keyboard, and *race to the bottom*, accompanied by a gesture clearly pointing down. The students in this group also performed exceptionally well in the case of the pseudo verb *nud down* accompanied by a gesture illustrating a plausible (i.e., correct) interpretation in context, thus showing once again their greater reliance on other modes beyond the verbal one. The CG performed better in the case of *race to the bottom*, too, but also in the case of *break through*, accompanied by a slightly perceivable sudden gesture of the speaker's index pointing outwards to the front, and of *fall apart*, the verb we matched with a counterintuitive gesture, probably because they relied on prior knowledge of the item or on other contextual cues (such as verbal co-text, prosody, facial expressions), whose possible influence cannot be completely excluded. Informants from the Dys group, instead, performed poorly in this case, probably due to the confusing contribution of the incongruent gesture. Among the more difficult stimuli for both groups were *shrink from* and *crowd out*, more specialised in meaning and accompanied by more complex gesture configurations (on *crowd out* see Masi 2016).

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
A case study comparing the performance of learners with and without dyslexia

89

7. Conclusions

Overall, the present case study, even though small, provides evidence in favour of a multimodal orientation and use of visual input and gestures in the learning/teaching of English phrasal verbs and idioms, especially when learners with dyslexia are involved. Indeed, the results appear to point to a positive answer to our main research question as proposed in the introduction. This has been highlighted by the better performance elicited through the visual mode where gestures were clearly visible, especially when learners with dyslexia were involved.

It would then be both interesting and useful to replicate and expand the scope of the experiment to validate the findings above by gathering more data from more informants, also taking into account the possible influence of cultural factors to verify their actual impact on the interpretation of gestures.[12] A higher degree of control over some variables would also be necessary, especially over prior knowledge of the target expressions, degree of transparency and correlated difficulty of stimuli (conceived of as word/gesture match), and other contextual cues that may influence interpretations. Also, our study was based on authentic materials, which are the ideal source for stimuli selection, although the identification of suitable samples is far from easy and may be an obstacle to the developments of the research as suggested above.

Bionotes: Silvia Masi is Associate Professor of English Language and Linguistics in the Department of Philology, Literature and Linguistics of the University of Pisa, where she has been teaching undergraduate and graduate students since 2004. She currently holds courses for the Degree Programmes in Foreign Languages and Literature, Digital Humanities and for the Master Course in Translation. Her scientific interests lie in the fields of lexical semantics, pragmatics, discourse analysis, scientific popularisation and translation. More recent research centres on the role of multimodality in the popularisation and translation of non-fiction for children and the development of multimodal literacy in and beyond ESP teaching.
Gianmarco Vignozzi, Ph.D. in English linguistics, is a Research Fellow in English language and translation at the University of Pisa where he teaches ESP at the Department of Law. His main research interests are in the field of corpus-assisted discourse analysis, audiovisual translation, and English for specific purposes (legal and political domains). His most recent publications include: *The Representation of Spoken discourse in Little Women: A journey through its original and dubbed adaptations* (Textus, 2021), *Embedding Oral Communication in Law Firm Websites: A Study on Identity Construction through Person Pro-forms in Attorneys' Video FAQs"* (Textus, 2022).

Authors' addresses: silvia.masi@unipi.it; gianmarco.vignozzi@unipi.it

---

[12] On the great number of gestures used esp. by Italians, see for example Bonaiuto and Bonaiuto 2014, as well as Kendon 2004.

References

Abolfazli Z. and Sadeghi K. 2017, *Improving English Language Learners' Idiomatic Competence: Does Mode of Teaching Play a Role?*, in "Iranian Journal of Language Teaching Research" 5 [3], pp. 61-79.

Alibali M. W. and Nathan M. 2007, *Teachers' gestures as a means of scaffolding students' understanding: Evidence from an early algebra lesson*, in "Video Research in the Learning Sciences", pp. 349-365.

Barlow M. 2011, *Corpus Linguistics and Theoretical Linguistics*, in "International Journal of Corpus Linguistics" 16 [1], pp. 13-44.

Beaudoin-Ryan L. 2017, *Gesture in socio-moral reasoning*, in Church R. B., Alibali M. W., Kelly S. D. (eds.), *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia, pp. 197-212.

Boers F. 2001, *Remembering figurative idioms by hypothesizing about their origin*, in "Prospect" 16, pp. 35-43.

Boers F., Eyckmans J. and Stengers H. 2007, *Presenting figurative idioms with a touch of etymology: More than mere mnemonics?*, in "Language Teaching Research" 11, pp. 43-62.

Boers F. and Lindstromberg S. 2008, *Cognitive Linguistic Approaches to Teaching Vocabulary and Phraseology*, Mouton de Gruyter, Berlin/New York.

Bonaiuto M. and Bonaiuto T. 2014, *Gestures and body language in Southern Europe: Italy*, in Müller C., Cienki A., Fricke E., Ladewig S. H., McNeill D. and Bressem J. (eds.) *Body – Language – Communication*, Vol. 2, Mouton de Gruyter, Berlin/New York, pp. 1240-1252.

Bonsignori V. and Crawford Camiciottoli B. (eds.) 2016, *Multimodality across Communicative Settings, Discourse Domains and Genres*, Cambridge Scholars Publishing, Newcastle-upon-Tyne.

Brown H. D. 2000, *Principles of language learning and teaching* (4th ed.), Longman, White Plains, NY.

Brugman C. and Lakoff G. 1988, *Cognitive typology and lexical networks*, in Small, S., Cottrell, G., Tannenhaus, M. (eds.), *Lexical Ambiguity Resolution*, Morgan Kaufman, San Mateo, CA, pp. 477-507.

Cacciari C. and Tabossi P. 1988, *The Comprehension of Idioms*, in "Journal of Memory and Language" 27, pp. 668-683.

Cacciari C. and Corradini P. 2015, *Literal Analysis and Idiom Retrieval in Ambiguous Idioms Processing: A Reading Time Study*, in "Journal of Cognitive Psychology" 27 [7], pp. 797-811.

Cappelli G. and Noccetti, S. 2016, *Teaching Specialised Vocabulary to Dyslexic Adult Second-Language Learners: A Proposal for Multimodal Lexical Input Processing Enhancement*, in Bonsignori, V. and Crawford Camiciottoli B. (eds), *Multimodality across Communicative Settings, Discourse Domains and Genres*, Cambridge Scholars Publishing, Newcastle-upon-Tyne, pp.37-64.

Cardillo R.. Basso Garcia R., Mammarella I. and Cornoldi C. 2018 *Pragmatics of language and theory of mind in children with dyslexia with associated language difficulties or nonverbal learning disabilities*, in "Applied Neuropsychology: Child" 7 [3], pp. 245-256, DOI: 10.1080/21622965.2017.1297946

Carter R. 1997, *Investigating English Discourse: Language, Literacy and Literature*, Routledge, London/ New York.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English:
A case study comparing the performance of learners with and without dyslexia

91

Castillo S. E. 2017, *Fostering Conceptual Metaphors in Vocabulary Teaching: Phrasal Verbs in Spanish Secondary Education. A Pedagogical Implementation*, PhD Dissertation, Universidad de la Rioja.

Celce-Murcia M. and Larsen-Freeman D. 1999, *The Grammar Book: An ESL/EFL Teacher's Course*, Heinle and Heinle, Boston.

Church R. B., Alibali M. W. and. Kelly S. D (eds.) 2017, *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia.

Church R. B. and Goldin-Meadow S. 2017, *So how does gesture function in speaking, communication, and thinking?*, in Church R. B., Alibali M. W., Kelly S. D. (eds.), *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia, pp. 397-412.

Condon N. 2008, *How cognitive linguistic motivations influence the learning of phrasal verbs*, in Boers F. and Lindstromberg S. (eds.), *Cognitive Linguistic Approaches to Teaching Vocabulary and Phraseology*, Mouton de Gruyter, Berlin/New York, pp. 133-158.

Conklin K. and Schmitt N. 2012, *The Processing of Formulaic Language*, in "Annual Review of Applied Linguistics" 32, pp. 45-61.

Cook S. W. and Fenn K. M. 2017, The function of gesture in learning and memory, in Church R. B., Alibali M. W., Kelly S. D. (eds.), *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia, pp.129-153.

Cooper T. C. 1999, *Processing of Idioms by L2 Learners of English*, in "TESOL Quarterly" 32 [2], pp. 233-262.

Crawford Camiciottoli B. and Bonsignori V. 2015, *The Pisa Audiovisual Corpus Project: A multimodal approach to ESP research and teaching*, in "ESP Today" 3 [2], pp.139-159.

Dirven R. 2001, *English phrasal verbs: Theory and didactic application*, in Pütz M., Niemeier S. and Dirven R. (eds.) *Applied Cognitive Linguistics II: Language Pedagogy*, Mouton de Gruyter, Berlin/New York, pp. 3-27.

Erman B. and Warren B. 2000, *The Idiom Principle and the Open Choice Principle*, in "Text" 20 [1], pp. 29-62.

Fernando C. 1996, *Idioms and Idiomaticity*, Oxford University Press, Oxford.

Fernando C. and Flavell R. 1981, *On Idiom: Critical Views and Perspectives*, University of Exeter Press, Exeter.

Fricke E., Bressem J. and Müller C. 2014, *Gesture families and gestural fields*, in Müller C., Cienki A., Fricke E., Ladewig S. H., McNeill D. and Bressem J. (eds.) *Body – Language – Communication*, Vol. 2, Mouton de Gruyter, Berlin/New York, pp. 1630-1640.

Gardner D. and Davies M. 2007, *Pointing Out Frequent Phrasal Verbs: A Corpus-Based Analysis*, in "TESOL Quarterly" 41, pp. 339-359.

Gibbs R. 2012, *Idioms and Formulaic Language*, in Geeraerts D. and Cuyckens H. (eds.) *The Oxford Handbook of Cognitive Linguistics*, Online edition, Oxford University Press, Oxford. https://academic.oup.com/edited-volume/34552/chapter-abstract/293172750

Glucksberg S. 2001, *Understanding Figurative Language: From Metaphors to Idioms*, Oxford University Press, Oxford.

Gullberg M. and McCafferty S. G. 2008, *Introduction to gesture and SLA: Toward an integrated approach*, in "Studies in Second Language Acquisition" 30, pp. 133-146.

Griffiths C. 2007, *Pragmatic Abilities in Adults with and Without Dyslexia: A Pilot Study*, in "Dyslexia" 13 [4], pp. 276-296.

Hanamoto H. 2017, *Negotiation of meaning in ELF (English as a lingua franca) interaction: Multimodal approach focusing on body movements including gestures*, in "Journal of Multimodal Communication Studies" 4 [1], pp. 23-28.

Holme R. 2009, *Gesture*, in *Cognitive Linguistics and Language Teaching*, Palgrave Macmillan, New York, pp. 54-62.

Hostetter A. B. and Boncoddo R. 2017, *Gesture highlight perceptual-motor representations in thinking*, in Church R. B., Alibali M. W., Kelly S. D. (eds.), *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia, pp. 155-174.

Jackendoff R. 1995, *The boundaries of the lexicon*, in Everaert M. *et al.* (eds.), *Idioms: Structural and Psychological Perspective*s, Hillsdale, Erlbaum, pp. 133-166.

Kartal G. and Uner S. 2017, *The effects of conceptual metaphors on the acquisition of phrasal verbs by Turkish EFL learners*, in "European Journal of Foreign Language Teaching" 2 [2], pp. 34-50.

Kelly S. D. 2017, *Exploring the boundaries of gesture-speech integration during language comprehension*, in Church R. B., Alibali M. W., Kelly S. D. (eds.), *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia, pp. 243-265.

Kelly S. D., Kravitz C. and Hopkins M. 2004, *Neural correlates of bimodal speech and gesture comprehension*, in "Brain and Language" 89 [1], pp. 352-260.

Kelly S. D., McDevitt T. and Esch M. 2009, *Brief training with co-speech gesture lends a hand to word learning in a foreign language*, in "Language and Cognitive Processes" 24 [2], pp. 313–334. https://doi.org/10.1080/01690960802365567

Kendon A. 2004, *Gesture: Visible Action as Utterance*, Cambridge University Press, Cambridge.

Kida T. 2008, *Does Gesture Aid Discourse Comprehension in the L2?*, in McCafferty S. G. and Stam G. (eds.), *Gesture, Second Language Acquisition and Classroom Research*, Routledge, New York, pp. 131-156.

Kövecses Z. 2001, *A cognitive linguistic view of learning idioms in an FLT context*, in Pütz M., Niemeier S. and Dirven R. (eds.) *Applied Cognitive Linguistics II: Language Pedagogy*, Mouton de Gruyter, Berlin/New York, pp. 87-115.

Kurtyka A. 2001, *Teaching English phrasal verbs: A cognitive approach*, in Pütz M., Niemeier S., Dirven R. (eds.), *Applied Cognitive Linguistics II: Language Pedagogy*, Mouton de Gruyter, Berlin/New York, pp. 29-54.

Lakoff G. 1987, *Women, Fire and Dangerous Things: What Categories Reveal about the Mind*, UCP, University of Chicago Press, Chicago.

Lazar G. 2003, *Meaning and Metaphor: Activities to Practise Figurative Language*, Cambridge University Press, Cambridge.

Lazaraton A. 2004, *Gesture and speech in the vocabulary explanations of one ESL teacher: A microanalytic inquiry*, in "Language Learning" 54 [1], pp. 79-117.

Lazaraton A and Ishihara N. 2005, *An examination of second language teacher practice, using microanalysis, self-reflection, and collaboration*, in "The Modern Language Journal" 89 [4], pp. 529-542.

Lin Y. 2017, *Co-occurrence of speech and gestures: A multimodal corpus linguistic approach to intercultural interaction*, in "Journal of Pragmatics" 117, pp. 155-167.

Lindner S. 1983, *A Lexico-Semantic Analysis of English Verb Particle Constructions*, Indiana University Linguistics Club, Bloomington.

Lindstromberg S. 1998, *English Prepositions Explained*, John Benjamins, Amsterdam/Philadelphia.

Littlemore J. 2009, *Applying Cognitive Linguistics to Second Language Learning and Teaching*, Palgrave Macmillan, New York.

On the role of gestures in the comprehension of phrasal verbs and idiomatic expressions in English: A case study comparing the performance of learners with and without dyslexia

93

Littlemore J., MacArthur F., Cienki A. and Holloway J. 2012, *How to Make Yourself Understood by International Students: The Role of Metaphor in Academic Tutorials*, in "ELT Research Papers" 12 [6], British Council London, London, pp. 1-22.

Macedonia M. and Kriegstein von K. 2012, *Gestures Enhance Foreign Language Learning*, in "Biolinguistics" 6 [3–4], pp. 393-416.

Macedonia, M., Müller K. and Friederici A. D. 2011, *The impact of iconic gestures on foreign language word learning and its neural substrate*, in "Hum Brain Mapp" 32 [6], pp. 982-98. doi: 10.1002/hbm.21084.

Mahpeykar N. and Tyler A. 2014, *A principled Cognitive Linguistics account of English phrasal verbs with up and out*, in "Language and Cognition" 7 [1], pp. 1-35.

Masi S. 2011, *Studies in Lexical Contrastive Semantics: English vis-à-vis Italian Spatial Particles*, Edizioni Plus – Pisa University Press, Pisa.

Masi S. 2016, *Gestures in Motion in Ted Talks: Towards Multimodal Literacy*, in Bonsignori V. and Crawford Camiciottoli B. (eds.), *Multimodality across Communicative Settings, Discourse Domains and Genres*, Cambridge Scholars Publishing, Newcastle-upon-Tyne, pp.146-165.

Masi S. 2019, *Complex mapping of words and gestures in TED Talks*, in Bonsignori, V., Cappelli G., Mattiello E. (eds.), *Worlds of Words: Complexity, Creativity, and Conventionality in English Language, Literature and Culture*, Pisa University Press, Pisa, pp. 115-126.

Masi S. 2020, *The multimodal representation of 'Ideas worth spreading' through TED Talks*, "Lingue e Linguaggi" 36, pp. 155-171.

McCafferty S. G. 2008, *Mimesis and second language acquisition: A sociocultural perspective*, in "Studies in Second Language Acquisition" 30, pp. 147-167.

McCafferty S. G. and Stam G. (eds.) 2008, *Gesture, Second Language Acquisition and Classroom Research*, Routledge, New York.

McNeill D. 1985, *So you think gestures are nonverbal?*, in "Psychological Review" 92 [3], pp. 350-371.

McNeill D. 1992, *Hand and Mind*, University of Chicago Press, Chicago.

McNeill D. 2005, *Gesture and Thought*, University of Chicago Press, Chicago.

Mittelberg I. 2018, *Gestures as image schemas and force gestalts: A dynamic systems approach augmented with motion-capture data analyses*, in "Cognitive Semiotics" 11 [1], https://doi.org/10.1515/cogsem-2018-0002.

Moon R. 1998, *Fixed Expressions and Idioms in English: A Corpus-Based Approach*, Oxford University Press, Oxford.

Müller C. 2004, *Forms and uses of the Palm Up Open Hand: A case of a gesture family?*, in Müller C. and Posner R. (eds.) *The Semantics and Pragmatics of Everyday Gestures*, Weidler, Berlin, pp. 233-256.

Müller C., Cienki A., Fricke E., Ladewig S. H., McNeill D. and Teßendorf S. 2013, *Body-Language-Communication. An International Handbook on Multimodality in Human Interaction*, De Gruyter Mouton, Berlin.

Nathan M. J. 2017, *One function of gesture is to make new ideas: The action-cognition transduction hypothesis*, in Church R. B., Alibali M. W., Kelly S. D. (eds.), *Why Gesture? How the hands function in speaking, thinking and communicating*, John Benjamins, Amsterdam/Philadelphia, pp. 175-196.

Noccetti S. and Cappelli G. 2018, *Blended learning and memory-training techniques for specialised vocabulary learning in adult EFL learners with dyslexia*, in Garzelli B. and Ghia E. (eds.), *Le lingue dei centri linguistici nelle sfide europee e internazionali: formazione e mercato del lavoro*, ETS, Pisa, pp.181-198.

Ping R. and Goldin-Meadow S. 2010, *Gesturing saves cognitive resources when talking about non-present objects*, in "Cognitive Science" 34 [4], pp. 602-619.

Quirk R., Greenbaum S., Leech G. and Svartvik J. 1985, *A Comprehensive Grammar of the English Language*, Longman, London.

Rudzka-Ostyn B. 2003, *Word Power: Phrasal Verbs and Compounds*, Mouton de Gruyter, Berlin/New York.

Skoufaki S. 2005, *Use of conceptual metaphors: A strategy for the guessing of an idiom's meaning?*", in Mattheoudakis M. and Psaltou-Joycey A. (eds.), *Selected Papers on Theoretical and Applied Linguistics from the 16th International Symposium April 2003*, Aristotle University of Thessaloniki, Thessaloniki, pp. 542-556.

Straube B., Green A., Weis S., Chatterjee A. and Kircher T. 2009, *Memory effects of speech and gesture binding: Cortical and hippocampal activation in relation to subsequent memory performance*, in "Journal of Cognitive Neuroscience" 21, pp. 821-836.

Siyanova-Chanturia A., Conklin K., Schmitt N. 2011, *Adding More Fuel to the Fire: An Eye-Tracking Study of Idiom Processing by Native and Non-Native Speakers*, in "Second Language Research" 27 [2], pp. 251-272.

Takaesu A. 2013, *TED Talks as an extensive listening resource for EAP students*, in "Language Education in Asia" 4 [2], pp. 150-162.

Takahashi C. and Matsuya A. 2013, *Learning of English Phrasal Verbs with Audiovisual Aids*, in *Conference Proceedings ICT for Language Learning 6th Conference Edition,* Florence, November 2013, pp. 222-226.

Taleghani-Nikazm C. 2008, *Gestures in Foreign Language Classrooms: An Empirical Analysis of Their Organization and Function*, in Bowles M., Foote R., Perpiñán S., Bhatt R. (eds.), *Selected Proceedings of the 2007 Second Language Research Forum*, Cascadilla Proceedings Project, Somerville, pp. 229-238.

Tyler A. and Evans V. 2003, *The Semantics of English Prepositions: Spatial Scenes, Embodied Meaning, and Cognition*, Cambridge University Press, Cambridge.

Vignozzi G. 2016, *How Idiomatic are Disney Films? The Multimodal Meaning-making of Idioms*, in Bonsignori V. and Crawford Camiciottoli B. (eds.), *Multimodality across Communicative Settings, Discourse Domains and Genres*, Cambridge Scholars Publishing, Newcastle-Upon-Tyne, pp. 236-264.

Vignozzi G. 2019, *How Gestures Contribute to the Meanings of Idiomatic Expressions and Phrasal Verbs in TV Broadcast Interviews: A Multimodal Analysis*, in "Lingue e Linguaggi" 29, pp. 383-406.

Wagner P., Malisz Z. and Kopp S. 2014, *Gesture and speech in interaction: An overview*, in "Speech Communication" 57, pp. 209-232.

Weinberg A., Fukawa-Connelly T. and Wiesner E. 2013, *Instructor gestures in proof-based mathematics lectures*, in Martinez M. and Castro Superfine A. (eds.) *Proceedings of the 35th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, University of Illinois at Chicago, Chicago, p. 1119.

White B. J. 2012, *A Conceptual Approach to the Instruction of Phrasal Verbs*, in "The Modern Language Journal" 96 [3], pp. 419-438.

Wood D. 2015, *Fundamentals of Formulaic Language: An Introduction*, Bloomsbury, London.

Wood D. 2019, *Classifying and Identifying Formulaic Language*, in Webb S. (ed.), *The Handbook of Vocabulary Studies*, Routledge, London/ New York, pp. 30-45.

Wray A. 2002, *Formulaic Language and the Lexicon*, Cambridge University Press, Cambridge.

Wray A. 2008, *Formulaic Language: Pushing the Boundaries*, Oxford University Press, Oxford.