Formulaic sequences as a regulatory mechanism for cognitive perturbations during the achievement of social goals

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1. Introduction

This paper considers two questions central to our understanding of formulaic sequences.[1] The first is: what are they *for?* To some, this is question may be nonsensical or at least uninteresting. They simple *are*: they emerge as a function of repetition in usage and are sustained through patterns of cultural practice in a community. But there is more to 'usage' than just patterns of frequency. We must understand what motivates the usage, and that entails recognizing the functions that they have: both cognitive and social. Human communication is a product not only of what we *can* do but also what we *prefer* and *need* to do. Thus, we must examine the different features of formulaic sequences in the context of their semantic, pragmatic and logistical deployment.

The second question is: what determines how much of a person's output is composed of formulaic sequences? Of course, to answer such a question we need an appropriate way to distinguish them reliably and appropriately from non-formulaic strings of words. That is not a simple matter, and a great deal has been written over the years about it (e.g. Nattinger & DeCarrico, 1992; Pawley & Syder, 1983; Weinert, 1995; Wray, 2002, 2009). Section 2 identifies characteristics relevant to this discussion.

The theoretical framework used for examining the questions is the model of 'Communicative Impact'. Communicative impact is the level of success a speaker has in achieving his or her various goals within a given speech event. The model draws into the same frame of reference core considerations in cognitive linguistics and socio-pragmatics. In a nutshell, it maps the relationship between how we process language and how we achieve the things we use language for. In particular, it helps examine what happens to interaction

[1] In line with my previous work (e.g. Wray 2002), I will use the term 'formulaic sequence' to refer to any string of words for which there is one or another kind of rationale for considering them to be a unit (e.g. semantic, processing speed, frequency, etc).

when the cognitive mechanisms underpinning language production and comprehension are subjected to excessive pressure. It will be proposed that the imperatives of interaction create dynamics for mitigating the effects of disrupted cognitive processing, and that formulaic sequences play a significant role in this compensatory process. The model also reveals how these repairs themselves, washing back into the socio-pragmatics of the interaction, can have unintended consequences for the speaker and hearer that partly account for why interaction easily breaks down when one of the speakers has an impaired or inadequately developed linguistic system.

The model will be exemplified in part with reference to second language use and dementia communication, since these are contexts in which the dynamics of compromise and rescue can be easily observed. However, the determinants of language use in these contexts are corollaries of a more general dynamic system governing how we all manage the cognitive constraints on language processing so as to achieve our socio-interactional goals consistently.

2. What are formulaic sequences *for*?

The challenge is to determine which of the many characteristics of formulaic sequences are the most important. Does one feature lead the way in terms of functionality, with the others simply consequential? Or is there more than one primary function to identify? If so, are the different functions in tension or alignment? Can different functions be associated with different sub-types of formulaic sequence? The argument developed below entails that inherent complexities with regard to these issues are part of the reason why multiword sequences constitute a difficult focus for research.

2.1. Characteristics of formulaic sequences

Table 1 lays out seven core characteristics that have been observed, or widely claimed, for some or all of the set of formulaic sequence types[2]. For each of the seven characteristics, one or more explanations is offered.

– insert Table 1 about here –

What might these characteristics have in common? Or which, among them, might determine others? The position adopted here is that formulaic sequences are one tool in the larger toolbox deployed for progressing an important agenda for the speaker: manipulating others in pursuit of goals associated with the speaker's well-being (Wray and Perkins 2000; Wray 2002). We shall return to the role of formulaic sequences in section 2.4, after exploring the drive that it supports.

2.2. The speaker's primary goal

Largely unconsciously, language is put to the task of influencing the actions, thoughts and/or feelings of others, to get leverage in modifying the speaker's world in desirable ways that are beyond his or her immediate personal control (c.f. Rendall et al 2009 on the purpose of animal communication).[3,4] The modification may be physical (i.e. needing someone to carry out some action on one's behalf), abstract (i.e. wanting information from someone; wanting someone to know something) or emotional (i.e. wanting to feel something; wanting someone to feel something). Encoding a message that has achieves the

[2] All are discussed at length in my previous work (Wray, 2002, 2008) as well as widely elsewhere in the research literature.

[3] All the same, we need not assume that language evolved for this purpose, though if it did not, then it has been exapted to it. Nor is it necessary to claim that language has no other purposes for humans. Nevertheless, the aim here is to account for most, if not all, linguistic behavior as a function of communicative impact.

[4] There is also a role for self-directed speech and for the various purposes of writing. But these aspects must be set aside here in the interests of brevity.

speaker's goals (i.e. has high communicative impact (see below) entails generating a linguistic form that is semantically, pragmatically and socio-culturally appropriate. It is vital that the message is not misunderstood, in terms of either semantics or pragmatic intention, and languages develop conventionalized, formulaic, forms that help ensure effective delivery, by requiring less processing effort to decode.

It may seem at first that this self-centred motivation for language cannot account for the give and take in co-operative communication, but that is far from the case. The complex cognitive and emotional life of the human entails that a speaker will often gain substantially from doing something beneficial to someone else. Typically, an utterance is encoded for the achievement of several different goals: a primary one (resulting in a core action, thought or feeling on the part of hearer) and various secondary ones aimed at improving or sustaining the speaker's (self-perceived) status in the eye of the hearer. For example, usually speakers will not want the hearer to be annoyed, to laugh at, or disagree with them. In terms of Politeness Theory (Brown & Levinson, 1987), speakers will usually need to protect their positive face, by inciting the hearer to respond collaboratively towards them, without threatening the hearer's negative face—i.e. making the hearer feel compromised in relation to his own wishes. High communicative impact will, in most cases, involve not only success in getting the hearer to act as agent for the desired change to the speaker's world, but also the protection of the relationship, since that relationship constitutes part of the context for future attempts at communicative impact. Additional complexity will arise when there is more than one hearer, since the goals of the speaker may be different for each one. The choices speakers make rely on a high level of command over the expressive potential of the language, a capacity to empathise with different parties and to locate themselves in a bigger picture, an ability to calculate the risk and pay off of different potential choices, and a good memory for what has been said and done before.

Because of the subtlety of the approach to getting all the things we need, modelling speaker behavior in this apparently self-interested way is not in any way at odds with accounts of the co-operative aspects of communication (e.g. Clark & Schaefer, 1989; Pickering & Garrod, 2004). It is in speakers' and hearers' interests to help each other towards meaning for at least two reasons. Firstly, speakers cannot achieve their goals unless the hearer both understands and is willing to respond in the intended way. Secondly, speaking and hearing roles constantly switch, while the agendas extend across the entire interactive event.

2.3. Communicative Impact: a model at the interface of social interaction and cognitive processing

The model[5] attempts to map the relationship between internal, cognitive aspects of language generation (compare Levelt 1989) and external, socio-pragmatic ones. The cognitive elements of the model are based on current understandings of how language is shaped by our ability to notice, remember and create, and how limitations in cognitive capacity, including in short term memory, simultaneous tracking and serial production, determine grammar and expression (e.g. Hurford, 2007). The socio-interactional components are founded in discourse theory and pragmatics. The model does little to reframe or reshape existing accounts of the two components. What it offers that is new is a consideration of how each affects the other.

Fig.1 lays out the sequence of stages for generating output. The best formulation for the message is determined by first gauging the context (to judge what is appropriate) and the

[5] The Communicative Impact model is complex and, in its entirety, entails consideration of many different theories and lines of evidence. Aspects of the model relating to the management of conflict in dementia care are outlined in Wray (2016).

shared knowledge (what the hearer already knows or might reasonably infer). A range of social and cognitive resources make this possible, all of which are potentially subject to variability across individuals and, to an extent, within the same individual at different times. The selection of the formulation is effected by drawing on linguistic resources, including the appropriate language and register, tone of voice, and the referential markers that will most appropriately signal shared knowledge with the hearer—including jargon terms, allusions, and pronominal forms. Only at this point can the components be accessed and the utterance executed.

The juxtaposed demands of managing the socio-interactional space and the cognitive loads associated with tracking information and generating output (as well as decoding input from others) mean that the system is susceptible to external pressures arising from unanticipated contexts and internal pressures on processing. For example, the inability to follow the conversation, recall what has been said, retrieve words or compose them into coherent output will all put at risk the speaker's capacity to achieve communicative impact. However, the drive to succeed is so strong, that the system will attempt to resist the problems, and provide its own repairs. Central to the compensatory mechanism are formulaic sequences. But to see why, we need first to understand the roles that they play in the unimpaired system.

– insert Figure 1 about here –

Fig.1: Encoding module

2.4. The roles of formulaic sequences in supporting communicative impact

Formulaic sequences can be seen to play a significant role in helping speakers achieve communicative impact. There is a tension between the need to express exactly the right

message and the need to ensure the delivery is adequately executed. All the persuasive words in the world will be useless if the hearer cannot receive and process them easily. If the hearer mishears, misunderstands, or loses interest, the message will be lost. If the hearer believes the speaker has finished before she has, or is given the opportunity through a hiatus to jump in with his own message, then, again, the speaker will fail to achieve communicative impact.

Thus, speakers will welcome the availability of two types of assistance: easily-recognized and understood word-strings that can minimize the risk of the hearer experiencing cognitive processing overload or incorrectly decoding the input; and easily-produced word-strings that can help smooth out the bumps in fluency that might arise in the course of generating output in real time. That is, speakers will be motivated to select formulaic material to support both their own production and the hearer's comprehension.

There is ample empirical evidence that certain word-strings are processed in a privileged manner (e.g. Arnon & Snider, 2010; Ellis & Simpson-Vlach, 2009; Kapatsinski & Radicke, 2009; Siyanova-Chanturia, Conklin & van Heuven, 2011; Tremblay & Baayen 2010; Tremblay, Asp, Johnson, Zarzycka Migdał, Bardouille and Newman, 2016). Furthermore, differential effects on language in people with Alzheimer's disease and Parkinson's disease indicate that formulaic language is "modulated in important ways by right-hemisphere and subcortical systems" (Van Lancker Sidtis, Choi, Alken & Sidtis, 2015: 1502).

The usefulness of formulaic sequences in reducing processing effort has long been recognized (e.g. Bolinger, 1976; Pawley & Syder, 1983). However, their full potential in determining the dynamics of interaction has not been fully appreciated—for, as we shall see later, the selections will have a washback effect into the context and shared knowledge, influencing what happens next.

– insert Fig.2 about here –

Fig.2: Motivations for selecting formulaic sequences with particular characteristics

In Fig.2, five requirements for effective encoding are listed, along with ways of achieving them. The selection choices match the characteristics of formulaic sequences that were listed under 3 to 7 in Table 1. The first requirement is for speakers to guide the hearer towards a fail-safe decoding of their output. The best way to achieve that is to make it easy to decode. Formulaic sequences that are easy to understand are thus a valuable component in their selection choices. Secondly, speakers need to deliver the message safely and efficiently. This means not relinquishing the floor before completion. To achieve that, speakers must sustain a level of fluency; formulaic sequences that hold the floor can help.

Thirdly, speakers need to minimize the chances of the hearer misinterpreting the message. This includes both semantic ambiguity and unintentional implications or pragmatic mismatches. To achieve this, speakers must anticipate what effect any given formulation of a message will have on the hearer: what associations it might engender, what the hearer might correctly or incorrectly infer about the speaker's beliefs, assumptions, priorities, and so on. This is a minefield, for how can one read the hearer's mind? But languages contain many pre-agreed formulas that are culturally accepted as playing a particular role. Proficient speakers have a fine-tuned awareness of the semantic and pragmatic effect of particular expressions, and can make judgements about what the hearer will take from their message.

Fourthly, to get hearers to buy into their message, speakers must come across as sincere and plausible. One way is to help hearers perceive the speaker as similar to themselves, by adopting expressions that index the speaker to a speech community they value (Wray, 2002). Finally, there is always a risk that the hearer might attend to a part of the message that is less important, and thus fail to respond to what the speaker intended. Speakers can mark old information as old, using established formulaic sequences, including repetition, so that the new information is more evident (Tannen, 2007).

What, then, of characteristics 1 and 2 in Table 1? They are consequences of the other five. If speakers select certain solutions often, then patterns of frequency will naturally arise. These patterns are not absolute, but relative to the range of options for expressing the message, and how often the message needs to be expressed. As for irregularity and opacity, if speakers select certain word-strings that are associated with semantic and, particularly, pragmatic functions, and within which internal modification has no value, then they will be passed between speakers intact, while the language changes around them. As a result, they may easily become fossilized, sustaining grammatical and lexical features that are no longer current (Bybee, 2006; Wray, 2002).

That formulaic sequences might have a further role, once the cognitive system is under pressure, has already been alluded to. In the next section, we consider this circumstance further.

3. Threats to communicative impact and how they are fixed

One does not have to have a cognitive impairment for problems to arise in achieving communicative impact. Tiredness, intoxication, lack of attention and competing tasks may all place pressure on the system by failing to supply, as needed, adequate information about the context and/or shared knowledge, words to express the concepts, adequate working memory to plan out a coherent turn, and so on. It is therefore not necessary to assume that a person with a more chronic difficulty with the system, such as a language learner with too little knowledge to enable the expression of desired messages, or a person with an acquired communication disorder such as aphasia or dementia, invents some new way of coping with the problems. Rather, individuals draw on the strategies for repairing problems that they developed as fully competent speakers of the (or another) language.

Returning to Fig.1, interruptions in the function or availability of any of the cognitive resources will compromise speakers' ability to express their message in the optimal way. In due course, not getting communicative impact, along with the effect on the hearer of encountering a non-optimal delivery, may upset the equilibrium of the social resources. To put it another way, if a speaker is unable to encode a message quite appropriately, it may threaten the hearer's positive or negative face, triggering a reaction from them (e.g. indignation, hurt, annoyance). This change in the socio-interactional climate, coupled with any information encoded in the hearer's response, will modify the parameters of the context, demanding different encoding choices next time. At worst, it can create strange pragmatic spaces that are not a reliable representation of the world.

For example, suppose a person with dementia cannot call her daughter's name to mind. The daughter is hurt that her mother cannot (apparently) remember who she is. She responds angrily. The communicative impact of the original output has been low—the speaker wanted to say something nice to her daughter, but forgetting her name has turned the utterance into an insult. Now she must attend to this emotional environment as she tries to encode her next message. And perhaps, having short term memory problems, soon she no longer remembers why there is such a hostile atmosphere between them (James 2008). Now she has too little information to navigate the context adequately. This makes her feel uncomfortable about speaking. Meanwhile, the daughter senses disappointing changes in the relationship. Over time, the quantity and quality of communication between the pair reduces.

Second language learners encounter different problems. A major lacuna might be vocabulary, and they may also find it cognitively stressful to use the L2, impeding their capacity to take in contextual information, such as what has been said already. They need to sustain fluency in order to achieve communicative impact, but must draw on non-optimal

resources (circumlocution, fillers, etc) to do so. Hearers may have to work extra hard to decode the speaker's intention. Furthermore, learners are typically social outsiders. They may not be familiar with social customs, assumptions and shared knowledge and may make faux pas by not knowing, or not knowing the nuances of, expressions that are needed to achieve communicative impact.

Because the primary drive for speaking to someone is to instill some sort of beneficial change in our world, failing to get the message across has an immediate negative effect on our well-being. Not surprisingly, then, we are equipped with strategies for repairing problems (including apologizing, repeating, rephrasing, circumlocuting, etc.). The strategy we select depends on what we perceive the problem to be and how we evaluate the context and state of play in the aftermath of our previous failure. Our repertoire of repairs extends well beyond formulaic sequences, or even just language. Gesture, images, sounds, and so on, can be harnessed to rescue problems with message delivery (consider how emoticons are used in e-messages to help the hearer interpret the emotional intention of the typed words). But language is the single most useful resource in most instances. And, since formulaic sequences play a significant part in the formulation of the message in the first place (Fig.2), it is not surprising that they are important for the repair process too. Table 2 illustrates the various ways in which formulaic material can support the speaker when problems arise.

– insert Table 2 about here –

Finally, a brief mention must be made of pre-emptive fixes,[6] which occur when speakers anticipate and attempt to address a problem before it can create difficulties. Language learners might say something (probably formulaically) to signal to hearers that they are not proficient, or ask interlocutors to speak slowly even before they have said anything. People

[6]The simple notion of a 'pre-emptive fix' overlooks the complexity of language planning, and over-estimates the visibility of problems that occur before a repair. However, for present purposes, it is sufficient.

with dementia who know they repeat themselves might preface statements with *as I've just said* (Davis, Maclagan, & Cook, 2013). The pre-emptive fix is very powerful because it restricts the range of adverse responses the hearer can make. Thus it helps to save the speaker's positive face.

However, using a pre-emptive fix can generate new problems, particularly in the dementia context. This is because they significantly challenge the capacity of the hearer to recognize what is happening in the discourse. Suppose a word (e.g. *dishwasher*) cannot be recalled, and there is a silence. The hearer has a reasonable chance of recognizing what the problem is and, perhaps, assisting. However, if a pre-emptive fix provides another lexical item that is easier to access, but not actually accurate (e.g. *oven*), then the hearer must second-guess what was intended, or may be completely misled. To put it another way, a pre-emptive fix may be so effective as to be absorbed into the fabric of the message—creating an alternative reality. This may create confusion and stress for the hearer (Wray, 2011, 2012, 2013, 2014, 2016).

4. What determines the quantity of formulaic material used by a speaker?

The quantity of formulaic material depends on several different factors. This section explores how these factors interact to determine how much, and what type of, formulaic material finds its way into output. Although they are of importance to the picture as a whole, space does not permit, here, consideration of differences between first and second language learners (see, however, Wray 2002 for extensive discussion of this matter; see also Ellis (2017, this issue), Arnon & Christiansen (2017, this issue) and McCauley & Christiansen (2017, this issue).

4.1. The overall quantity of formulaic material used

One of the important considerations for the speaker is sustaining fluency, since losing the turn means not delivering the message that is the conduit for communicative impact. Fluency is under threat from cognitive pressure.[7] In order to sustain the desirable level of fluency, some compensatory actions may be needed, and the deployment of formulaic language plays a major part. Overall, the amount of formulaic material used is likely to increase in tandem with increasing cognitive pressure, though other actions can also be taken, including reading from notes, slowing down one's delivery, etc. But the dynamics of compensation are complicated by at least two factors. One is that the demands for fluency are variable. The other is that some types of formulaic language are more acceptable than others, according to context.

Sometimes it is extremely important to be fluent in one's output: it is difficult and embarrassing to listen to a joke that is not fluently delivered; and few would want fillers in their marriage vows. But if the speaker has been given the floor because she has a story that everyone wants to hear (e.g. as key witness in a police interview), then the risk of interruption is reduced, and more dysfluency may be tolerated. There are contexts where speakers must manipulate their hearers into perceiving them as highly fluent and they must avoid not only hesitations but also the use of fillers to plug gaps in fluency. Actors, for example, work hard to ensure their lines can be delivered without a hitch. Similarly, Quran memorisers invest thousands of hours in being able to repeat the text precisely and fluently (Saleem, 2015).

On the other hand, there are contexts in which being too fluent is a problem. If

[7] It would be reasonable to separate out extrinsic cognitive pressure, caused by distractions, tiredness, neurological damage and inadequate knowledge of the language, from intrinsic pressure, caused by the requirements for encoding a particular message. However, for the present, and in keeping with the previous discussion, they will be jointly termed 'cognitive pressure'.

speakers want to convince the hearer of their sincerity, or that they are responding 'off the cuff' to questions they in fact anticipated and rehearsed in advance, then they may want to tone down their level of fluency lest it sound too 'off pat'. Deliberately injecting dysfluency markers would give the impression that answering the question has entailed thought and, hence, a significant cognitive load.

For these reasons, we need to refer not to *fluency*, but to the *situationally-appropriate level of fluency*. Fig.3 show how changes in processing ease must be compensated for so that fluency is not compromised.

– insert Fig.3 about here –

Fig.3: Mechanism for sustaining fluency across fluctuations in cognitive pressure

– insert Fig.4 about here –

Fig.4: Internal dynamics of the compensatory actions system

If we look inside the 'compensatory actions' element of Fig.3 there is a further dynamic relationship (Fig.4). The different ways that dysfluency can be compensated for are not equally desirable and, as we already saw, the boundary between the desirable and undesirable shifts according to the context. For example, in one context a speaker might be appreciated for informality (fillers), clarity (slowed delivery) and accessibility (well-known expressions). In another, the same solutions could leave the speaker's output judged under-prepared, under-animated and cliché-ridden.

Each element of Fig.4 will be considered below, but first, something must be said about the three contributions to holding the floor that were presented in Fig.2: items that are easy to encode, items that happen to be long, and items that are long for the purpose of sustaining fluency. The latter two survive in Fig.4. The first, however, does not appear.

This is because it is not a compensatory mechanism, even though it is a rationale for the

use of formulaic language and is relevant to fluency. Ease of encoding can be conceptualized as how few operations it takes to get from stored lexical material to accurate and appropriately configured output (Dąbrowska & Lieven, 2005; Tomasello, 2003). Speakers can help themselves by drawing preformed multiword sequences from their lexicon. Even where they select partly-lexicalised frames, such as *the X-er the Y-er* or as *X as X can be*, processing is minimized, compared with constructing something completely novel (Sosa & MacFarlane 2002).

However, considerable limitations may be associated with only choosing material that is easy for the *speaker* to process. There are at least two other considerations: the need to express a particular combination of meanings and pragmatic effects, and the need to target what is easy for the *hearer to decode*. The former puts an absolute limit on what can be chosen—it has to mean the right thing. The latter can also constrain the choices, for sometimes what the hearer can decode easily is at odds with what the speaker can encode easily.

In normal circumstances, the speaker's quest for communicative impact will impel the prioritization of output that the hearer can decode easily. If those patterns are not part of her own formulaic inventory, the cognitive load on her production will increase, raising the need for other kinds of formulaic material. Thus the interactional context can both reduce and increase the speaker's cognitive load.

Where speakers and hearers share the same variety, so that ease of decoding and ease of encoding overlap, speakers will have the bonus of gaining fluency when choosing the formulations easiest for the hearer to decode. But when the hearer is from a speech community whose formulaic expressions are not in the speaker's natural repertoire, there will be a conflict between delivering easily decodable output, and keeping the encoding level low. It follows that the level of similarity between the speaker's and hearer's codes is a

potential index for the cognitive burden on the speaker and, thus, the amount of compensatory action that must be taken. Meanwhile, the formulaic material central to these encoding/decoding clashes is not suitable for use in compensatory action, reducing the available choices.

4.2. Distribution of types of formulaic language

In addition to residual fillers (Wray 2002), Fig.4 includes two types of formulaic language that need to be discussed here: items that are naturally long, and items that are created long for the purpose of managing fluency. (The 'other strategies' in Fig.4 are not part of formulaic language.)

4.2.1. Items that are naturally long

Some lexical items happen to be more than one word long, e.g. *Martin Luther King; the day before yesterday; see the light at the end of the tunnel; not know which way is/was up.* The availability of such items is, to some extent, chance, for the speaker begins with a meaning that is to be conveyed, selects the most contextually appropriate encoding, and must work with whatever form that lexical item happens to have.

However, speakers sometimes do have choice. English, at least, has plenty of expressions that are longer than they 'need' to be. Clichés based on the 'as' comparator are one set: *sick as a parrot, as honest as the day is long; flat as a pancake; free as a bird*. Another set is the light verb + abstract noun alternative to a verb alone, e.g. *take into consideration (consider); give/pay attention to (attend to/notice); put trust in (trust).* Although there are other benefits to such choices, such as the capacity for gradation (*he put much trust in; *he much trusted*) the speaker can exploit having longer and shorter expressions of the same idea,

selecting the one that best balances processing pressure and fluency.

Thus, in contexts where cognitive pressure is high and fluency is important, there is some scope for speakers to regulate the flow of output by taking options that use naturally occurring multiword lexical items and by expressing simple ideas in a longer way, such as with a cliché or complex verb phrase.

4.2.2. Items whose length is intended to assist with fluent delivery

Many multiword discourse markers can be recognized as having a fluency-promoting role, including prevaricators like *that's a really good question* and *let me see I can find a way to…*, and context-appropriate 'fillers' like the regular interpolation of *ladies and gentlemen*, or *God willing*. Other word-strings are specifically constructed. Comedians bring pre-rehearsed jokes and anecdotes to 'unscripted' comedy shows, as a tool for extemporizing in a high-stress context where it is vital to minimize dysfluency. People about to be interviewed for a job might rehearse what they will say, creating a memory trace of the formulation for easy retrieval. Speakers' deliberate preparation of formulaic material indicates their awareness of their potential inability adequately to manage fluency under high cognitive pressure.

4.2.3. Other compensatory actions

If the combined strategies are still inadequate to sustain fluency, the speaker has additional tools in the box. One is modifying the relationship between cognitive processing and delivery. For example, the speed of speech can be slowed down, or written notes can be used to secure greater fluency than might be possible under cognitive pressure. Should all else fail, then fillers like *er, um* can plug what would otherwise be hiatuses. Since they still entail phonation, they can hold at bay a would-be interrupter.

5. Conclusion

Two questions were posed in this paper. (1) What are formulaic sequences for? (2) What determines how many there are? The suggested answer to (1) is that formulaic sequences are a subset of the tools used by a speaker to cope with fluctuations in the level of cognitive pressure, both internal (generated by linguistic processing) and external (distractions, tiredness, cognitive deficit or inadequate linguistic proficiency). In turn, cognitive pressure is to some extent the product of our communicative ambition, whereby we push our linguistic systems to the limit to maximize our agency over others in pursuit of the world we want. As such, formulaic sequences are a necessary means for evening out the competing pressures associated with effective communication.

Consequently, with respect to question (2), the predicted level of formulaicity in someone's output can potentially be indexed with the cognitive pressure experienced by the speaker and the specific contextual constraints on relieving that pressure. The compensatory mechanisms are put to the test when the system is under extreme strain. People with dementia experience great cognitive pressure both from the environment and their own language processing needs. They may not have easy access to lexical material, including naturally long items. In order to avoid becoming evidently dysfluent, they are likely to rely increasingly heavily on formulaic material that is, or has become, useful for managing fluency, such as personal and routine expressions, and repeated stories. Meanwhile, second language learners have normal cognitive processing capacities, but the generation of fluent output in the L2 may place additional strain on them. Whereas a person with dementia needs a wide repertoire of formulaic sequences to sustain fluency, a language learner might be unable to sustain fluency on account of having only a small repertoire of formulaic material, giving less scope to manage the pace of output.

It is consistent with the speaker's aim of achieving communicative impact that any perceived or anticipated problems in delivering the desired message will be pre-emptively fixed. However, repairs that draw on an incomplete or compromised system (as with both people with dementia and language learners) may well be non-optimal, and thus unintentionally create confusion. Since confusion directly impacts the contextual environment within which subsequent speech events occur, pragmatic disruptions affect both the communicative effectiveness of both the impaired and unimpaired party (Wray 2016). It is for this reason that formulaic language is considered both beneficial and damaging to effective communication in challenging circumstances.

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Table 1: Characteristics of formulaic sequences

The formulaic sequence can be:	This could be because:
1. Frequent and familiar.	• It is often used in the speech community (e.g. *Wotcha mate*) • It is the predominant way of conveying the meaning (e.g. *have a nice day*) • It conveys a meaning that often needs to be expressed (e.g. *at the top of the...*)
2. Semantically opaque and/or irregular in form	• It cannot be predicted and must be learned whole (e.g. *battle royal*) • It cannot be broken down to reveal meaning (e.g. *bullet point*) • It has not been regularized by 'outsiders' (see Wray & Grace, 2007 for how non-native speakers with social power can regularize irregularities)
3. Easy to produce and understand.	• It is a single lexical unit (e.g. *woe betide*) • It trips easily off the tongue (e.g. *helter skelter*) • It is familiar (e.g. *happy birthday*) • It is predictable (e.g *one, two, three…)*
4. Longer than one word.	• The named phenomenon happens to be a multiword string (e.g. *the day before yesterday*) • A multiword string has been preferred for some reason (e.g. *Before I answer that can I just…*)
5. Has an additional semantic or pragmatic role.	• It is the agreed way of achieving something in the speech community (e.g. *break a leg* to wish an actor luck)
6. Signals the speaker's group identity	• It marks out speech community members from outsiders (e.g. *And I'm so, like…*)
7. Pre-established in form.	• Its precise form has social significance (e.g. the text of the Quran, see Saleem, 2015) • It is a recognized way of creating a context for new information (Kuiper, 1996)

Table 2: Compromises to communicative impact and potential solutions

	Feature	Problem	Cause	Risk	Solution options
	Feed-in to Encoder				
1	Ideas supporting message	Unable to think fast enough to come up with a fluent stream of ideas	Reduced cognitive capacity (e.g. because of tiredness)	Threat to fluency and coherence	Compensate with additional filler lexical units, to hold the floor while thinking
2	Ideas supporting message	Unable to juxtapose ideas into relationships	Reduced short term memory (e.g. because of dementia)	Threat to fluency and coherence	Compensate with additional filler lexical units, to hold the floor while thinking
	Selection of formulation				
3	Language choice	Selected a language hearer doesn't use	Inadequate contextual information.	Threat to message comprehension	Re-encode in another language
4	Language choice	Selected a language hearer doesn't expect	(In dementia) lost ability to recognize hearer and thus know which language is appropriate	Emotional impact on hearer	Re-encode in another language. Or hearer accommodates
5	Tone	The tone of the speaker's output is inappropriate for achieving the intended outcome	The speaker lacks empathy with the hearer, and cannot anticipate appropriately how to present the message (e.g. inadequate contextual knowledge)	The hearer takes the message the wrong way/does not respond in the desired way.	Restate message incorporating new intonation, rescue formulas, etc.
	Access of components				
6	Lexical units	Unable to label an idea or relationship between ideas	Insufficient lexical units known, because this is a language the speaker doesn't know well	Threat to fluency. Threat to the capacity to deliver the message at all	Compensate with additional filler lexical units, to hold the floor while thinking. Invent a lexical unit (e.g. by translating from the first language). Circumlocute
7	Lexical units	Unable to access the lexical unit, even though it is known	Problems with lexical retrieval, e.g, because of aphasia or dementia	Threat to fluency. Threat to the capacity to deliver the message at all	Compensate with additional filler lexical units, to hold the floor while thinking. Replace the target with a proform (e.g. it, thing, there). Circumlocute
	Execution of utterance				
8	Articulation	Difficulties sequencing or producing sounds	Tiredness, intoxication; Dysarthria	Threat to fluency and coherence	Reattempt; select pre-rehearsed word-strings
9	Fluency of delivery	Difficulties sequencing elements	Working memory problems	Threat to fluency and coherence	Prefer pre-rehearsed word-strings