

Maturational Age Effects on the Status and Role of Formulaic Sequences in First and Second Language Learning

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It is commonly observed that the lexically dense and stylistically creative language that is characteristic of carefully planned writing or speech differs sharply from the repetitive and predictable patterns found in language produced under time pressure. Human beings seem to have two linguistic moduli, one that maximizes expressiveness while disregarding cognitive investment, and another one that minimizes cognitive work through the use of ready-made linguistic routines based on prefabricated chunks of language. These linguistic chunks, here referred to as “formulaic sequences” (FSs), until recently have only received sporadic attention. Generative linguistics (e.g., Chomsky, 1957) in particular, with its focus on the creative competence of the ideal native speaker, has traditionally treated FSs as uninteresting epiphenomena of performance. In recent decades, however, numerous researchers, particularly those with usage-based perspectives on acquisition, have taken renewed interest in FSs.

One reason for the revived interest is the robust finding that FSs are a pervasive feature of L1 and L2 linguistic performance. Estimates of formulaic language vary greatly depending on classification criteria, but most researchers agree that FSs underlie much of our everyday speech and writing. Biber et al.

(1999), looking at “lexical bundles,” found that 30% of the words in conversation occur within recurrent expressions compared to 21% in academic prose (pp. 993, 994). Erman and Warren (2000) estimate that prefabricated word combinations constitute about 55% of spoken and written discourse, while Altenberg (1990) concludes that as much as 70% of adult native language might be formulaic. Even if we assume the lower estimates, FSs seem to feature prominently in linguistic performance. Wray (1992) goes so far as to claim that formulaicity is the default mode of processing and that “our grammatical capabilities are on hand for emergencies, rather in the way that an engineer is on standby at a factory, while the less knowledgeable but competent operators routinely work the machines” (p. 10).

Most researchers, regardless of their basic theoretical commitments, would generally agree that learners’ communicative needs frequently exceed their developing competence, and that learners must consequently rely at times on rote chunks of language. Research has shown that FSs are in fact used in various walks of life to mitigate the cognitive pressures of intense communicative interactions (Kuiper, 2004) and that they can, in the case of adult L2 learners, promote greater fluency in speaking (Boers, Eyckmans, Kappel, Stengers, & Demecheleer, 2006; Towell, Hawkins, & Bazergui, 1996; Wood, 2006). Mueller (2011) has demonstrated that NNSs often rely on FSs to compensate for gaps in semantic knowledge.

Numerous researchers (e.g., N. C. Ellis, 2002; Tomasello, 2003), particularly those favoring a usage-based theoretical framework, argue for a strong role for FSs, claiming that in addition to

enhancing performance, FSs aid in the development of underlying competence. FSs, it is claimed, serve as crucial building blocks that learners use to develop low-scope patterns (patterns with limited productive extension), which in turn form the basis for fully analyzed grammars. Some researchers have argued that early (Wong Fillmore, 1976) and late (Bygate, 1988; Nattinger & DeCarrico, 1992; Pawley & Syder, 1983; Willis, 1990) L2 learning follows the same pattern. Recent research has shown that there may be subtle differences between NSs' and NNSs' use of frequency information. NSs appear to be more sensitive to mutual information (the tendency above chance for two or more words to be associated), whereas NNSs appear to rely more on raw frequency. Others (e.g., Granger, 1998; Krashen & Scarcella, 1978; Yorio, 1989) are skeptical regarding adult L2 learners' ability to use FSs as a bootstrapping mechanism.

A large body of research has accumulated on formulaic sequences, especially with the popularity of usage-based models during the last two decades, yet there is little consensus regarding the status of FSs in terms of NSs' and NNSs' mental lexicons and developing grammars. One possible reason for the disparity in findings is the failure to fully account for differences among children and adults in terms of psycholinguistic mechanisms and contexts of acquisition. FS research (with the exception of Wray, 2002) has generally examined L1 and L2 use of FSs in isolation without considering maturation and aging. This gap in current research is unfortunate since critical period effects may potentially explain some of the discrepancies in the findings of FS research, and since, by the same token, findings in FSs research

could shed light on which cognitive mechanisms and avenues to second language acquisition (SLA) survive into adulthood. In an attempt to fill this theoretical lacuna, this review summarizes and compares the findings in the L1 and L2 FS research in order to determine the effects of age and exposure on FS acquisition and the underlying psycholinguistic processes. The review, while rudimentary, can hopefully provide the basis for the design of future empirical studies that more directly address the effects of age and exposure on FS acquisition.

Research Questions

This review is motivated by the following research questions related to the role of FSs in terms of performance and acquisition and the effects of explanatory mechanisms such as critical period (CP) effects, the amount and type of exposure, and individual differences:

1. To what extent do FSs contribute to the L1 and L2 performance of children and adults? In more concrete terms, how frequently do FSs appear in the L1 and L2 linguistic production of children and adults?
2. What is the role of FSs in L1, early L2, and late L2 acquisition? Do FSs directly facilitate the development of syntactic knowledge or are they unimportant epiphenomena of only peripheral importance?
3. Which explanatory mechanisms best account for differences in the status and role of FSs? Are these differences primarily a result of age-related factors and related cognitive

mechanisms? To what extent can they be attributed to alternative mechanisms such as the amount and type of exposure or to individual differences such as learning strategies and aptitude? How much exposure to an L2, often operationalized as length of residence (LOR), is required for significant facilitative effects to occur? Do different exposure opportunities lead to different outcomes in English as a Foreign Language (EFL) and English as a Second Language (ESL) contexts?

This review, in its treatment of these questions, will initially discuss the definition of FSs and the key methodologies used in this area of research. It will then summarize findings regarding FSs in five contexts: (1) early L1 acquisition, (2) early L2 acquisition in immersion settings, (3) early L2 acquisition in instruction-only settings, (4) late L2 acquisition in immersion settings, and (5) late L2 acquisition in instruction-only settings. The review's final section will reflect on the findings' implications for research on the critical period hypothesis.

Defining Formulaic Sequences

Researchers have examined FSs from a wide range of perspectives. In order to synthesize divergent research and findings, it is important to determine which definition (and by implication, which theoretical focus) is best-suited to the investigation of FSs within the field of SLA. Any research focus, in order to be conducive to theory building, should ultimately target the cognitive state and development of the language learner

as well as the mechanisms that underlie development. For this reason, the current study will adopt Wray's (2000) definition of FSs as "a sequence, continuous or discontinuous of words or other elements, which is, or appears to be, prefabricated: that is, stored and retrieved whole from the memory at the time of use, rather than being subject to generation or analysis by the language grammar" (p. 465).

FSs, when processed holistically, may thus include most of the linguistic forms commonly referred to as collocations, prefabs, or routines and can include frame and slot patterns, even when the slot is internal to the frame. FSs can also include patterns that are not complete structural units.¹ It must be emphasized that formulaicity, according to this conception, is an aspect of psycholinguistic processing within an individual speaker at a particular point in time and is not a feature of language or texts, although language and texts may reveal the nature of psycholinguistic processing of an individual or a particular population. For this reason, this paper will not use compositionality as a criterion for determining formulaicity. Idioms will therefore be viewed as a subset of FSs. In this paper, the "other elements" in Wray's definition will be interpreted as excluding abstract grammatical elements. In other words, formulaicity will refer to direct form-to-form concatenations that

1 Corpus analysis has demonstrated that only about 15% of "lexical bundles" (a large subset of the FSs being discussed in this paper) can be regarded as complete structure units. In many cases, the final word of the lexical bundle forms the first word of the following structure (D. Biber et al., 1999, p. 995).

are, in turn, linked directly to meaning without the possibility of paradigmatic variation.²

Methodologies for Investigating FSs

Research on FSs has typically involved observational, corpus-based, and experimental approaches.

Observational Research

Many studies, especially developmental L1 acquisition research that began in earnest in the early 1970s (e.g., Brown & Hanlon, 1970) involved detailed longitudinal studies of children. FSs, when mentioned in such studies, were largely defined through theoretical criteria such as interactive function or were deduced from the absence of productivity within the learner's developing language. Many of these studies have relied, at least partially, on native speaker (NS) intuition when defining FSs.³ Recent longitudinal studies (e.g., Lieven, Pine, & Baldwin, 1997) have tried to develop quantitative coding schemes based on more objective criteria for the distinction between FSs, low-scope patterns, and utterances generated by grammatical knowledge.

2 In the case of slot-and-frame patterns mentioned above, the frame is technically the only component regarded as a FS.

3 As Wray (2002) points out, intuition is limited in several respects as it is impractical when dealing with large data sets and is blind to the regularities that go beyond a native speaker's surface awareness (p. 23). More importantly, a reliance on intuition is problematic when applied to non-native speakers (NNSs) who may vary significantly as a result of differences in their L1s, acquisition routes, amounts and types of exposure, and proficiency.

Corpus-based Research

In order to avoid the shortcomings of NS intuition and small sample sizes, many researchers have studied FSs through corpus analysis. The advantage of such research is the ability to uncover subtle patterns that are only apparent within large data sets. Corpus-analysis takes several forms.

Phraseology. Many studies have employed a phraseological approach (Cowie, 1981) involving detailed classification schemes that tend to exclude pragmatically-based formulaic routines. Phraseological researchers generally focus exclusively on FSs that form a unified syntactic frame and are instantiated in texts. Such a focus is appropriate for domains of inquiry (e.g., stylistics or genre analysis) in which a given text or group of texts is the explanandum, but is somewhat less appropriate for inquiries into language acquisition. For this reason, this review will use phraseological and related research only to the extent to which it provides indirect clues to the nature of psycholinguistic processes associated with formula-based acquisition in individual learners.

Contrastive interlanguage analysis. Granger (1996) has proposed a corpus-based approach to FSs that uses a revised form of contrastive analysis called Contrastive Interlanguage Analysis (CIA). Unlike traditional contrastive analysis, CIA compares native and non-native interlanguage varieties of the same language. A key accomplishment in this area has been the ICLE project which has developed learner language corpora for a couple dozen languages. Research based on the ICLE corpus is relevant to this study as it sheds light on general differences between native and non-native speakers' use of FSs as seen in written texts. There

has also been some related research (e.g., Bartning & Hammarberg, 2007) in this area involving corpora of transcribed L2 speech.

Frequency-based approaches. Other corpus-based researchers adopt a frequency-based approach (Sinclair, 1991). Research in this area typically involves the search for frequent co-occurrence of word types within massive data sets. Such research generally involves less manual sorting of corpus searches and is thus able to provide more reliable statistical analysis across larger corpora. Despite its statistical power, this line of research must be interpreted with caution due to several limitations. First, this research approach may identify frequent sequences that sprawl across clause boundaries. These highly frequent lexical units may not have any psychological validity and may thus be little more than artifacts from corpora. Second, there is tremendous disagreement among researchers regarding the threshold at which frequency effects (as ascertained through corpus analysis) reflect distinct processing mechanisms in individual L1 learners.⁴ This disagreement complicates attempts to relate the results of corpora research to experimental research focused on psycholinguistic models of SLA.

An even more trenchant criticism, put forth by Bley-Vroman (2002), is that collocation can occur at the conceptual rather

4 Frequency-based research on L2 users is particularly difficult due to the small size of learner corpora, the range of learners' proficiency levels and the differences in acquisition routes among late L2 learners. Schmitt, Grandage, and Adolphs (2004) conducted experiments examining the psycholinguistic validity of FSs derived from corpus analysis and found that only some of the items were stored holistically and that there were differences between NSs and NNSs.

than the lexical level. A corpus might tell us that *blue* and *sky* collocate but does this connection reflect a linguistic form-form link or a mere truism about the hue of the sky when viewed from a terrestrial vantage point? Bley-Vroman, for his part, may overemphasize this theoretical problem when he claims that the statistical structure of language is “derivative and with little direct explanatory force” (p. 210), yet this potential limitation must be kept in mind when interpreting research in this area.⁵ One solution is to determine the ratio within a corpus between a message and the particular linguistic forms used to express that message, but this solution introduces other methodological problems as it requires time-consuming analysis involving subtle semantic distinctions between roughly synonymous linguistic segments. In light of these limitations, this literature review will interpret frequency-based research with caution, and since frequency-based research relies on L1 corpora, the review will primarily look at this research for insights into the psychological mechanisms underlying FS use in L1 users.⁶

Structural approaches. The structural approach (e.g., Gitsaki, 1996), includes, in its analysis of collocations, the juxtaposition of grammatical elements. Taguchi (2007), as a good example of this approach, explicitly avoids “unanalyzed, purely formulaic

5 Researchers working within the Cognitive Linguistics paradigm (e.g., Kövecses & Szabó, 1996) have also pointed out that idioms and other collocations considered as arbitrary are often motivated by metaphors operating at the conceptual level.

6 For a scathing attack on the idea that language acquisition consists of frequency-based abstraction of regularities from input, see Eubank and Gregg (2002).

expressions” and instead limits her study to chunks that have previously been targeted by “explicit meta-linguistic explanations” in learner’s textbooks since such chunks are likely to be “productive” (p. 437, 438). “Chunks” in her study, to give just two examples, include sequences such as noun + *wa* (topic marker particle) and noun + *no* (possessive particle) + noun (p. 457). While Taguchi, citing Ellis, Sinclair, and others, positions her study within the broader field of FS research, it is clear that such abstract, grammatical “chunks” are of a completely different nature than the memorized form-form mappings discussed by most researchers in this area. Her use of the same word to refer to opposing phenomena (i.e., unproductive form-to-form mapping versus productive and fully analyzed form-meaning mapping) is confusing.⁷ Since Taguchi’s study and other structure-based research include patterns which are outside the scope of this paper, this literature review will exclude most studies employing the structural approach to productive sequences and will consider only the “lexical collocations” from Gitsaki’s study.

Experimental Approaches

A number of experimental studies, primarily focused on NSs, have examined FSs from psycholinguistic perspectives, focusing

⁷ These differences in definitions and criteria may in part reflect the inability in the field to distinguish between proceduralized knowledge, automatized knowledge, and lexical units learned, stored, and retrieved as wholes. Wray (2002) alludes to this methodological difficulty and seems to accept the idea that some psychologically valid FSs represent fused elements that were once separate within the learner’s interlanguage system.

on a wide range of phenomena to include phonology, access speed, idiom processing, eye-movement (Underwood, Schmitt, & Galpin, 2004; Vilkaitė, 2016), and code-switching (Backus, 1999).

Phonology and supersegmentals. Many researchers (Bybee, 1998, 2002, 2006; Vogel Sosa, 2000) in this area have provided excellent evidence for the psycholinguistic reality of FSs by examining phonological reduction associated with frequently encountered forms. Other researchers (Raupach, 1984; Van Lancker, Canter, & Terbeek, 1981) have similarly argued for the existence of FSs based on stress patterns, articulation, and fluency.

Access times. Other researchers, focusing on lexical access, have used the response latency paradigm to demonstrate memory-based storage. Some researchers (e.g., Wray, 2002) have argued that native speakers store massive numbers of FSs in spite of the fact that many of these are fully analyzable by the grammar. In order to demonstrate the psychological validity of such sequences, Vogel Sosa and MacFarlane (2002) conducted an experiment in which 45 NSs pushed a button once they heard the word *of* within spoken sentences taken from an online corpus of phone conversations. Subjects listened to sentences containing both high-frequency (e.g., kind of) and low frequency collocations (e.g., type of). The authors reasoned that slower reaction times would result if the high frequency FSs were stored holistically since these would need to be mentally segmented in order to complete the task. The authors found significantly slower reaction times, as well as lower accuracy, for the high-frequency FSs, suggesting holistic storage for these fully analyzed phrases within the native speaker's mental lexicon.

Idiom research. Psycholinguistic research has also focused extensively on idioms since these are, by definition, non-compositional in nature and must therefore be memorized holistically. In a landmark study, Swinney and Cutler (1979), having asked subjects to determine if a phrase was acceptable English, found that subjects responded more quickly to idioms, suggesting a processing advantage for memorized chunks. Giora (2003), in her Graded Salience Hypothesis, has argued that this faster access for idioms can at times create the impression of irony as speakers automatically process a phrase's more accessible idiomatic meaning before considering more appropriate meanings based on contextual cues.

FSs and Age

In this section, learners' acquisition of FSs is discussed in relationship to age. Five general circumstances will be considered: (1) L1 acquisition, (2) early⁸ L2 acquisition within an immersion context, (3) early L2 acquisition within instruction-only settings, (4) adult L2 acquisition within immersion contexts, and (5) adult L2 acquisition within instruction-only settings. Each section will discuss key studies in detail while presenting the findings of other studies in summary form in tables.

L1 acquisition. FSs have been discussed in terms of both developmental processes and native competence. According to Nick Ellis (2003), language development passes from chunk learning,

8 "Early" will be defined in this paper as corresponding to the period prior to the end of the Critical Period, which will be operationalized as a gradual decline from around age 6 or 7 (with phonology probably declining earlier) that ends around age 17 (DeKeyser, 2000).

to low-scope patterns, and then to the fully productive patterns characteristic of native-like competence.⁹ The facilitative role of rote learning¹⁰ and FSs in the subsequent development of grammar has been confirmed in a number of studies (Berman, 1986; Lieven et al., 1997; Pine & Lieven, 1993). R. Clark (1974), in an observational study of her son Adam from age 2;9 to 3, noted the child's tendency to incorporate caregiver speech in follow-on utterances and the use of FSs (often repeated) as a way to build up sentences. FSs were presumably being used to overcome limitations in cognitive processing and as the basis for grammatical analysis. Rice (1999), examining a corpus for 32 children's first use of the prepositions *to* and *for*, found that the earliest senses used by these children did not reflect diachronic patterns of semantic extension. Instead, it was the frequency of use in the child's linguistic environment and co-occurrence in collocations with favored verbs or other useful expressions that proved to be the major determinant of early production. Such findings suggest that children initially match large language strings to meaning instead of attempting to establish core abstract meanings for function words.

Lieven, Pine, and Baldwin (1997) attempted to provide a

9 Clark (1982) similarly describes acquisition as moving from rote memory to analogy and finally to rules. However, Clark concedes that the distinction between analogy and rules is not always easy to make. Berman (1986) provides a slightly more detailed scheme according to which children move from rote knowledge to early modifications, interim schemas (the beginning of grammar), and fully internalized abstract rules.

10 Individual words are not FSs as defined in this paper, yet in the case of L1 acquisition, they can be treated as similar if their semantic and syntactic features have not yet been fully differentiated.

methodologically rigorous study of early FS use in early L1 development. In order to avoid confounds related to different rates of developmental maturity, the authors matched 12 subjects (age 1;0-3;0) by determining the point at which they produced 20 distinct utterance types. A continuous record was then kept by parents and the first 300 multiword utterances were analyzed based on a strictly applied coding scheme that classified utterances as frozen (the elements do not occur independently), intermediate (one word occurs independently and one word is in a new position), and constructed (one word occurs independently and one word is in yet another position). The authors found that a mean of 63% of the multiword utterances fit one of the first 25 patterns and that only 8.4% neither fit a pattern nor were defined as frozen. While the authors acknowledge the somewhat mechanical and arbitrary nature of their coding scheme, they interpret the results as supporting an emergent view of language acquisition in which structures are united into frames that eventually join together to form more abstract grammatical representations.¹¹

L1 learners at various ages seem to use FSs to enhance online linguistic performance. Newport and her colleagues, in studies reported in Newport (1990), examined three groups of learners (30)

11 Akhtar and Tomasello (1997) provide additional evidence that younger children tend to be slow to create abstract categories over exemplars in the input. In their first experiment, the authors exposed 10 children age 2;9 to 3;8 to novel causative verbs modeled with four structures: (1) no argument, agent only, patient only, and both agent and patient. In elicitation tasks, the children almost always reproduced the surface structure that they had originally heard with the verb and in the few cases in which they did not reproduce the surface structure, they were almost always incorrect.

of American Sign Language (ASL) who differed in terms of their age of L1 acquisition. The three groups had to perform production and comprehension tasks related to verbs of motion, which in ASL require different morpheme combinations based on path and manner of motion. The researchers found that the older learners would frequently use frozen FSs, often incorporating morphemes that were inappropriate. As the study focused primarily on age-related differences and not FSs, the results are merely suggestive, yet they would seem to imply that late L1 learners have the ability to perform the associative chunk learning and form-meaning matching necessary to acquire FSs but are unable to form the abstract grammatical abstractions characteristic of native speakers' competence.

Early L2 acquisition in an immersion context. Most of the larger studies on FSs have focused on adults; hence relatively few studies have been conducted on early L2 acquisition of FSs. Many of the observational studies suggest that young L2 learners make extensive use of FSs to enhance performance and that FSs form the basis for subsequent analysis as well. Furthermore, the studies show that many L2 learners, unlike L1 learners, seem to use long FSs to negotiate situation-based routines from early on (Huang & Hatch, 1978; Kenyeres & Kenyeres, 1938). The observational studies, although longitudinal, generally observe the expansion of FSs to low-scope patterns but do not observe the full breakdown of the patterns into general grammatical rules.¹²

12 The failure to trace the entire developmental process from FSs to grammatical generalizations probably stems from methodological limitations. Most studies simply do not last long enough and do not observe linguistic productions with sufficient granularity to determine the precise developmental trajectory of specific forms.

Among studies examining early L2 acquisition, Wong Fillmore's (1976) pioneering study of children newly arrived from Mexico is important for a number of methodological innovations. Many observational studies had relied on data taken from adult-child interactions. The studies had therefore captured only a limited range of typical language-learning contexts. Many children, especially immigrant children, presumably receive virtually all of their English input via peer and classroom interactions. Wong Fillmore therefore made her observations (106 hours, all transcribed) of the five children in the study (5;7-7;3 years of age) while they were interacting with a monolingual (in one case, a bilingual) English-speaking friend. She found that FSs played an essential role in enabling children to interact with English-speaking peers. FSs thus, at the very least, indirectly aided acquisition by enabling the oral interactions known to facilitate L2 acquisition (see Long & Porter, 1985). The five children gradually moved from FSs to low-scope patterns, and then to more analyzed language. FSs were used as an initial wedge to open up slots in sentence structure that would later be subject to paradigmatic variation.

One of the most surprising findings in the study was the amount of individual variation that existed among early learners. Nora, the most successful learner, progressed further in her English in three months than two other children did during the entire year of the study. The author claims that Nora succeeded due to her extensive use of FSs and highly integrative motivation, two factors that led to extensive L2 input and interaction. The study thus provides strong evidence for a facilitative effect of FSs on performance in peer interaction and suggestive evidence that FSs

form the basis for subsequent grammatical analysis.

The table below displays some of the other key studies on the early L2 acquisition of FSs. The studies have been roughly sequenced according to the age of the subjects.

Table 1

*Early L2 Acquisition of FSs in an Immersion Context*¹³

Study	n	Subjects	Method	Findings
(Perera, 2001)	4	4 pre-school Japanese children in two-way immersion programs in SF, age 3;4 to 5;3	Observation and recordings	Most novel sentences were constructed from FSs or analyzed FSs.
(Bahns, Burmeister, & Vogel, 1986)	4	Children (age 3;11, 5;11, 7;11, 8;11) who only had naturalistic exposure to Eng.	Analysis of 3,000 pages of father's (Wode's) notes	Children often used sophisticated language within FSs, which were subsequently broken down into more productive patterns.
(Huang & Hatch, 1978)	1	5;1 yr old boy from Taiwan	Intensive daily Observations over first 41 months of acquisition. 13 recording sessions on weekends (14 hrs)	Amazing ability to imitate even long FSs almost from the beginning
(Hakuta, 1974, 1976)	1	Japanese early learner of English, observed from age 5;4 (5 mo. after exposure) to 6;5	Longitudinal naturalistic study using transcribed recordings (at least 2 hrs. per week)	Erratic U-shaped development
(Kenyeres & Kenyeres, 1938)	1	6-yr-old Hungarian daughter learning Fr.	Observations	Extensive use of long strings
(Wong Fillmore, 1976)	5	Children, 5;7-7;3 naturally acquiring English in U.S., all newly arrived from Mexico	Observations	FSs help learners notice, interpret, and acquire patterns based on the structure. FSs would be used to open up slots in sentence structure. FSs facilitate interaction, which in turns, leads to more input. Role of FSs significantly affected by IDs.
(R. Ellis, 1984)	3	Children (11, 11, 13) learning L2 English in London	Classroom observation used to look at routines in Ss spontaneous speech with special focus on development of "I don't know"	FSs did not need to be taught to be acquired. FSs were important basis for creative speech. FSs were sometimes extended by combining routines. "I don't know" was eventually developed into a low-scope pattern. FSs were sometimes successfully taught (whereas grammar rules weren't).

13 All of the tables in this paper will use the following abbreviations: Ch. (Chinese), Eng. (English), Fr. (French), Ger. (German), ID (individual difference), Ss (students), T (teacher), trans. (translation) and vocab. (vocabulary).

Early L2 acquisition of FSs in an instruction-only context.

Whereas studies based on early immersion contexts tend to agree that FSs significantly enhance performance and probably form an important basis for grammatical development, the studies of instructional-only contexts present a more muddled picture. Girard and Sionis (2003)¹⁴ conducted one of the few studies that looked at the L2 classroom attainment of young children. The authors found that children's FSs tended to be syntactically correct (89% accuracy), phonologically correct (91% accuracy), and appropriate (88% accuracy), an indication that young children are able to acquire FSs implicitly much like L1 learners.

Two studies of adolescent British learners of French (Myles, Hooper, & Mitchell, 1998; Myles, Mitchell, & Hooper, 1999) suggest a highly facilitative role for FSs. These studies examined 16 learners using an analysis of 2,084 utterances that were recorded during one-on-one data-elicitation tasks performed during three years of French study (7th- to 9th grade).¹⁵ The authors employed a rigorous methodology. The psycholinguistic validity of the FSs was ensured through multiple criteria. Moreover, particular FSs (*j'aime*, *j'adore*, and *j'habite*¹⁶ in the 1998 study and *comment t'appelle-tu*¹⁷ in the 1999 study) were targeted, allowing the authors to observe detailed development over long stretches of time. The

14 The subjects in this study were technically studying as part of an "immersion" class but the authors themselves state that the instruction resembled ordinary classroom teaching in which language itself tended to be the focus.

15 Subjects were age 11 or 12 at the beginning of the study.

16 *I like*, *I love*, and *I live* respectively.

17 *What's your name?*

authors found that the FSs were, in fact, unpacked and thus formed the basis for subsequent analysis, but that FSs were not immediately discarded once syntactic analysis was in place. They furthermore found that learners who initially memorized more FSs were earliest to engage in creative construction.

Weinert (1994) carried out a similar study of Scottish learners of German age 10 to 11, focusing on the acquisition of negation. Using oral data-elicitation procedures, the author found that FSs helped learners go beyond the limitations of their interlanguage grammar and even enabled them to skip over certain transitional structures found in the production of naturalistic learners. A particularly interesting finding was that learners displayed accurate use of one observed structure (*kein* + *haben*) 80.5% of the time when the structure occurred with old vocabulary but were accurate only 42% of the time when using new vocabulary. This suggests that FSs continue to be used to boost the accuracy of performance even after the abstract grammatical system begins to undergo proceduralization.

The studies discussed so far suggest that FSs play a significant role in terms of both performance and grammatical development. Tode's (2003) large-scale study of Japanese learners reached a different conclusion. Studying slightly older learners (8th and 9th grade), Tode looked at students' suppliance of the copula *be* in 14 linguistic contexts on a written test. Although both groups showed evidence of chunk learning, grade 9 participants, despite their extra year of exposure, did not show improvement in analyzing the rule. Tode interprets the results as demonstrating that even after extensive exposure, students are unable to acquire abstract

grammar rules through associative chunk learning and instead require targeted explicit instruction.

The discrepancy between the first three studies discussed above and Tode's study may be attributed to several factors. First, Tode's subjects had more to learn due to the typological distance between Japanese and English. English, like German, has constituent movement due to negation and, like French (although to a lesser degree), has morphology marking person, number, and tense. Japanese, on the other hand, has only a sentence final copula with morphology that marks tense and indexes register. The effect of typological distance may have been exacerbated by age differences. Tode's subjects were also slightly older and thus may have found it more difficult to extract patterns from the limited input found in a non-immersion context.

The following table lists key studies on the early acquisition of FSs in a non-immersion context. The studies have been roughly sequenced according to subjects' age.

Table 2

Early L2 Acquisition of FSs in an Instruction-only Context

Study	n	Subjects	Method	Targets/Focus	Findings
(Girard & Sionis, 2003)	15	Ss of Eng. in France, age 5-7	Observation and recordings	N/A	FSs usually syntactically correct (89%), phonologically correct (91%), and appropriate (88%).
(Myles et al., 1998; Myles et al., 1999)	16	16 British learners of Fr. age 11 or 12 at start of study and 13 to 14 at end	Analysis of 2,084 utterances that were recorded and transcribed	J'aime, J'adore, and J'habite; Interrogative: Comment t'appelles-tu?	FSs are instrumental in acquisition. FSs are unpacked for subsequent analysis. FSs aren't immediately discarded once syntactic analysis is in place. Ss who memorized FSs were earliest to engage in creative construction.
(Weinert, 1994)	42	Scottish learners of German (about 3 hrs. per week), age 10-16, living in Britain who received primarily practice-based lessons	Longitudinal study	German negation: post-verbal placement of negative particle and use of nicht and kein	Classroom learners, as the result of drills, etc., use FSs to outperform competence and development of productive knowledge FSs lead to divergence (often temporary) from naturalistic development route. Target-like production high with small number of verbs that occur in early learning but drops when learners start to use larger repertoire of verbs. Learners mistakes reflect tendency to use FSs taken from activities associated with word forms Limitation: Findings might not generalize well to more situations involving more communicative instruction.
(Gitsaki, 1999)	275	275 Greek junior high school Ss of English, 91 1 st yr., 94 2 nd yr., 90 3 rd yr., all 12-15 yrs old	Analysis of FSs in textbooks for each grade based on: (1) essay writing task, (2) translation task (3) fill-in-the-blank task	Lexical collocations (many involving prepositions and phrasal verbs using spatial terms) and grammatical collocations	Lexical collocations are more difficult for learners if they're arbitrary and unpredictable. Collocational knowledge correlates with saliency, language proficiency, maturation, instruction, and low L1-L2 differences (p. 145). Limitation: Uses a structural approach which includes "grammatical collocations" —a category not relevant to this review.
(Tode, 2003)	111 and 107	8 th (age 13 and 14) and 9 th grade (age 14 and 15) Japanese EFL learners of English	Written elicitation test comparing 8 th and 9 th graders	Suppliance rule for copula <i>be</i> in 14 linguistic contexts	Although both groups showed evidence of chunk learning, grade 9 participants did not show improvement in analyzing the rule despite having had an additional year of exposure. Scores for individuals varied significantly (perhaps due to aptitude).

Adult L2 acquisition in an immersion context. Some studies clearly show that at least some adult learners are able to acquire native-like patterns of use based on patterns in the input. Bartning and Hammarberg (2007) examined corpus speech and written materials produced by 40 learners of French and Swedish who

were between the age of 19 and 25. Looking at the learners' use of French *c'est* and Swedish *det är* (both meaning it is), the authors found that the NNSs used the items in the more frequent constructions (based on NS corpora) and at similar percentages. As the patterns were unlikely to have been explicitly targeted in instruction, the authors conclude that learners were sensitive to the frequency of forms encountered in incidental classroom talk and in interactions outside of class.

Other research indicates that adult learners have a difficult time learning FSs and that the FSs that are acquired often display errors in terms of form or use. Yorio (1989) attributes this inaccuracy to the permeability of FSs to NNSs' interlanguage rules. In an analysis of 14 compositions written by an 18-year-old Korean speaker who had lived in the U.S. for five years, Yorio found phrases such as *at the morning* instead of the target-like *in the morning*. Yorio's conclusion that FSs are being acquired and then altered within the black box of the learner's interlanguage¹⁸ is not totally convincing. Many of the FSs Yorio cites could very well have been created through the productive interlanguage rules of the learner.¹⁹ Other errors that Yorio discusses are interesting in that they show phonological resemblance to the target forms but with errors in the unstressed syllables of the phrase. To cite just several examples, Yorio (p. 63) lists *today date* (today's date), *in*

18 Lombard (1997) provides a similar analysis of errors, describing many of the Chinese learners' FSs in his study as "idiosyncratic" FSs even when these appear to be constructed through productive interlanguage rules.

19 In this case, *at the morning* was probably modeled on the Korean phrase *achim e* (morning + at).

return (in turn), and *put more attention to* (pay more attention to). It is interesting to note that many of the mistakes involve similar phonemes (as the /p/ in *put* and *pay*) or phonological reductions or additions. Instead of concluding that these FSs have been internalized and then altered, it seems just as likely that they were never internalized correctly to begin with.

Several studies show that *instructed* adult learners with massive amounts of input and extensive exposure in an immersion environment do learn FSs incidentally from the input (Miyakoshi, 2004; Schmitt, Dörnyei, Adolphs, & Durow, 2004). The failure of *uninstructed* learners to use FSs as the basis of grammatical analysis (Hanania & Gradman, 1977; Schmidt, 1983) suggests a strong interface between implicit and explicit knowledge. It may be the case that learners with better explicit knowledge of linguistic structure (and perhaps better aptitude) are able to use top-down explicit processes to clean up errant phonological processing of input.

In short, greater acquisition (varying from trivial to significant in different studies) of FSs by advanced learners with more exposure suggests that FSs can only be acquired implicitly after massive amounts of input. However, adults' abilities in this area seem to be somewhat compromised by L2 phonological decoding ability, a language aptitude partly retained by only some adults (Sparks, Patton, Ganschow, Humbach, & Javorsky, 2006), and faulty interlanguage grammars, which appear to be an inevitable outcome of late L2 acquisition (DeKeyser, 2000; J. L. Mueller, Hahne, Fujii, & Friederici, 2005; Newport, 1990). Some studies (Adolphs & Durow, 2004; Dörnyei, Durow, & Zahran, 2004) have

shown an additional role for motivation, which may influence FS acquisition by facilitating interaction, which in turn increases input. The table below displays some of the key studies in this area.

Table 3

Adult L2 Acquisition of FSs in an Immersion Context

Study	n	Subjects	Method	Targets/Focus	Findings
(Adolphs & Durow, 2004)	2	2 female adult Ch. college Ss, 1 with high & 1 with low integration	Qualitative study of interviews	N/A	More highly integrated student increased FS use over 7-month span and most of the increase used most highly frequent words (according to NS corpus). Low integrated student showed less overlap with NS corpus over time.
(Bonk, 2001)	98	87% East-Asian speakers of various proficiency levels	60 item test consisting of 3 equal components, subject to Rasch Analysis & a 49-item general proficiency measure	Verb-object & verb-prep. FSs, figurative-use-of-verb phrases (often included Intervening elements to hinder use of unanalyzed chunk knowledge)	Moderately high correlation (.73 after correction for attenuation) between proficiency measures and collocational proficiency Significant variation among learners LOR did not seem to be significant in itself (apart from its contribution to proficiency). Weakness: Verb+prep portion of the test had low reliability (.47). Items weren' t systematically chosen.
(Bardovi-Harlig, 2002)	16	Adults, mixed L1s, learning English	Longitudinal study of learners' written and oral production using Ts' logs	<i>Will & going to</i>	Formulaic use: "I'm going to write about ...," (a form perhaps needed for fluency) Some generalization of pattern was seen. Minor influence from instruction Rather sporadic use in naturally occurring data
(Bolander, 1989)	60	Learners of Swedish, L1s: 20 Finnish 20 Polish 20 Spanish half of Ss in each group are high proficiency & half low	Analysis of two 15-minute interviews during beginning and end of course Analysis of speech during picture description task	Negation in main clause, subordinate clause, etc.	FSs acquired due to perceptual salience vs. frequency in input. FSs show much higher use of certain constructions with first person and specific verbs expressing opinions. Many FSs aren' t from textbook but are from small-talk in the classroom.

Study	n	Subjects	Method	Targets/Focus	Findings
(Dörnyei et al., 2004)	7	Post-grad Ss, Chinese and Japanese who had not lived in UK previously	2 or 3 monthly interviews of Ss selected from larger group for their extreme success (or lack of success) in FS acquisition	N/A	Successful acquisition of FSs seems to result from (1) ability to successfully break social barriers and interact with language community, (2) motivation, and perhaps (3) aptitude.
(Hanania & Gradman, 1977)	1	19 yr. old Saudi woman, 6 weeks in U.S.	Once per month taped visits	N/A	Subject used simple structures that were then expanded and linked. MLU growth was similar to child. Learning was extremely slow.
(Howarth, 1998)	10	Foreign, MA Ss	Use of continuum model to analyze native corpora from LOB and analysis (individually) of 10 learner essays	Academic writing	Conventional collocations = 25% vs. 38% for NSs Lack of correlation between proficiency and deviant collocations Cognitive strategies: (1) avoidance, (2) experimentation, (3) transfer, (4) analogy, and (5) repetition.
(Jaworski, 1990)	30, 31	American speakers of Polish Polish NSs	NNs and NSs asked to rapidly write dialogues about friends meeting at a party	Pragmatically-oriented FSs used between friends	American learners of Polish overused FSs Weakness: Highly subjective classification criteria and little information on quantitative analysis
(Jones & Haywood, 2004)	21	EAP Ss	Treatment group (10) got FS training (2 hr per week training over 10 weeks); control group didn't.	Academic FSs	Heightened awareness led to slight improvement in production.
(Miyakoshi, 2004)	42	Japanese learners of English in Hawaii	Japanese-to-English translation task, GJT, familiarity rating task	Adjectival constructions with <i>for</i> or <i>that</i> + NP	Advanced learners show greater sensitivity to text frequency and hence less variability as a group
(Scarcella, 1979)	30	Spanish-speaking adults in advanced ESL class	Test of FS ability, naturalness of FSs confirmed by 20 NSs	N/A	FSs not easily acquired by adults. 25% of errors due to partially acquired routines. Many errors were syntactically correct but pragmatically wrong

Study	n	Subjects	Method	Targets/Focus	Findings
(Schmidt, 1983)	1	Japanese speaker living in Hawaii, a naturalistic learner	Qualitative study	N/A	FSs extracted from diverse input were used extensively. FSs contributed to performance but didn't seem to contribute much to the grammatical system.
(Schmidt & Frota, 1986)	1	Eng. speaker, with advanced meta-linguistic skills in Brazil	Diary study of acquisition in situation involving high amounts of input and instruction	N/A	FSs from input and fused interlanguage forms were used with varying degrees of success. Subject showed limited ability to extend forms.
(Schmitt, Dörnyei, et al., 2004)	94	94 EAP Ss of Eng., studying in Eng., mostly age 22-26, above or near 550 on TOEFL or 6.0 on IELTS, mostly (63) Chinese 70 did 2 nd phase	Treatment: Exposure during 2 or 3 mo. intensive period of instruction, Ts drew Ss attention of each FS at least once Measures: Compilation of FSs based on frequency in FS literature, appearance in class materials, frequency, & T's intuitions regarding usefulness - FSs placed in 2 texts Productive measure: Fill-in-the-blank test with initial letter(s) given, along with a gloss Receptive measure: multiple choice of FSs used to fill in a blank Vocab. size test & Aptitude & motivational profile	FS used in EAP	Learners had considerable knowledge of FSs before starting the course (17 of 20 items on receptive test, 13 of 20 on production test): On average, they knew 87% of words in 3000 freq. band and 56% in the 5000 freq. band Vocab size measures and FS measures showed correlations of only modest strength Significant gains in both receptive and productive measures, despite ceiling effect on T1 receptive test Analysis of change of mastery (p. 66): Unknown→unknown=16% Unknown→receptive=40% Unknown→productive=44% No correlation between FS gain scores and motivation or aptitude

Study	n	Subjects	Method	Targets/Focus	Findings
(Schmitt, Grandage, et al., 2004)	79	34 NNS 45 NNSs (over half Ch. speakers)	Oral dictation task preceded by a short arithmetic task	FSs taken from corpus analysis and the FS literature	Corpus data does not provide sufficient grounds for assuming that lexical sequences are stored holistically.
(Schmitt & Underwood, 2004)	20 20	NNSs (adults) NNSs	Comparison of reading times in self-paced reading task (clicking space bar for next word to appear) for word appearing last in FS and same word appearing outside the FS	N/A	Failure to detect significant differences in both groups, suggesting that items in FSs must be viewed together for a facilitative effect to take place
(Spöttl & McCarthy, 2004)	17	Adults (mostly in 20s)	Qualitative data collection using think-aloud protocols performed with translating FSs from L2 Eng. to L1 German and into L3 and/or L4 Fr. and Sp. Multiple choice test with L1- and L2-based distractors (taken by 14 subjects) Self-assessment questionnaire	Opaque strings that occur with high frequency in CANCODE spoken corpus	Think-alouds revealed following processing patterns: (1) automatic (used by those with near-native L2 competence, all who had lived extensively in the countries of their L2 and L3), (2) synthetic evaluative processing (most commonly used): initial translation aborted and search process begun which produced a number of responses that were then evaluated, (3) analytic evaluative processing: similar to above but based on individual words from FS Strategies varied depending on FS. Multiple choice test results were fairly high.
(Wood, 2006)	11	ESL learners in Canada (Spanish, Chinese, & Japanese speaking)	Qualitative analysis of MLR (mean length of run) and FRR (formula/run ratios) of narrative speech samples from responses to 3 silent films	N/A	FSs played a clear role in furthering development of speech fluency over time. Weakness: Native speaker judgments used to identify FSs. Rater reliability not reported.

Study	n	Subjects	Method	Targets/Focus	Findings
(Yorio, 1989) Study #1	1	18-year-old Korean speaker who came to U.S. around age 13	Analysis of 14 written compositions		<p>FSs are often learned inaccurately and thus appear to be permeable to interlanguage rules → weakness: The examples given (“I have lots money” and “at the morning”) can both be explained by two other factors: (1) phonological non-salience, and (2) production based on interlanguage rules (often influenced by the L1), and individual lexical items (“at the morning” seems to be based on Korean achim e).</p> <p>Adults make little use of FSs and when they do, they don’ t use it to further their grammatical development → weakness: The study wasn’ t longitudinal so this interpretation, based on post hoc suppositions, isn’ t justified.</p>
(Yorio, 1989) Study #2	25 15	<p>ESL Ss who had lived in the U.S. between 5 and 7 years & NSs</p> <p>Both groups scored low on writing tests</p>	Comparison of ESL Ss’s compositions with those of 15 English NSs		<p>NSs use more (36%) opaque FSs (e.g., bring up) than NNSs (6%).</p> <p>Weakness: Many mistakes cited by author are better explained by lack of phonological salience (as in the ex. “being taking care of”) combined with weak linguistic knowledge (particularly syntactic but also semantic). In the case of NSs, misheard FSs can be probably be “cleaned up” through reanalysis based on competence.</p>
Studies involving both non-immersion and immersion contexts.					
(Towell et al., 1996)	12	Undergrad learners of Fr., around 19 & 20, before and after 6-mo. study abroad	Subjects shown film then asked to retell story, quantitative comparisons of battery of fluency measures, qualitative analysis of 2 Ss (higher initial performer and subject with greatest improvement) who had high mean lengths of run	N/A	<p>Increased fluency was due to increase in length and complexity of linguistic units.</p> <p>Issue: Article seems to treat proceduralized knowledge and FSs as the same.</p>

Studies involving both non-immersion and immersion contexts.				
(Yorio, 1989) Study #3	Immigrant speakers of Spanish in U.S. for 5 or 6 yrs. & EFL Ss of Eng. in Argentina who have studied Eng. for 3-5 years	Comparison of essays		EFL Ss had greater proficiency in their writing, used more idioms, and had more authentic writing. Weakness: Much information on the study (e.g., number of subjects) isn't reported.

Adult L2 acquisition of FSs in an instruction-only context.

Adult learners in non-immersion contexts often lack massive amounts of input, a requisite for implicit language acquisition. For this reason, one would expect these learners to be disadvantaged in some respects. The research in this area partly confirms this. Numerous studies report poor FS knowledge for adults in a non-immersion context (Bahns & Eldaw, 1993; Farghal & Obiedat, 1995; Fayez-Hussein, 1990; Granger, 1998; Parkinson, 2015; Zughoul & Abdul-Fattah, 2003). One of the key studies in this area is Nesselhauf's (2005) investigation of 207 German-speaking learners of English using 318 essays in the German subset of the ICLE corpus. The learners were mostly third or fourth year university students with advanced English skills, yet they still made mistakes on about a third of the FSs in the corpus. Years of classroom instruction led to a decrease in FS use but had no effect on accuracy. Length of residence (LOR) in English-speaking countries also led to a decrease in FS use²⁰ but also led to a slight

20 Reduced use of FSs would suggest a tendency to use more marked single-word lexical units as learning advances, although this interpretation would not explain Nesselhauf's finding that dictionary use during essay writing led to an increase in NNSs' use of FSs.

improvement in accuracy, with students with an LOR of a month or less displaying 38.9% accuracy, those with an LOR between one and six months displaying 35.4% accuracy, and those with an LOR of seven months or more displaying 33.5% accuracy (p. 236). The results suggest that adult learning based primarily on frequency of FSs in the input seems to progress at a snail's pace and only with massive exposure over extended periods of time.

Nesselhauf and other researchers have found that adults in non-immersion contexts find it extremely difficult to learn semantically bleached FSs such as light verb constructions (e.g., *do homework*) and phrasal verbs (e.g., *hang out*). Altenberg and Granger (2001) found that even advanced French and Swedish EFL learners had significant problems with light verbs, particularly the delexical use of *make* (e.g., *make an argument*).

Researchers have also found that learners often avoid errors by using vague language in place of a FS. Much work in this area has been done on intensifiers in adjective + noun combinations. Leśniewska (2006), in a large study comparing 113 Polish speakers with 61 NSs using a gap-completion task and an acceptability task, found that NNSs made extensive use of general purpose modifiers to avoid more restrictive intensifiers. Fayez-Hussein (1990) found that 38.3% of Jordanian undergraduate's responses to a fill-in multiple choice test could be accounted for by the tendency to use generic unmarked terms. Shih (2000), examining a Taiwanese corpus, found a marked tendency to use vague terms such as *big*, even when describing abstract nouns that collocate with specific intensifying adjectives.

Many studies of non-immersion contexts (Fayez-Hussein, 1990;

Shih, 2000; Zughoul & Abdul-Fattah, 2003) attribute adult FS errors to L1 interference. Nesselhauf (2003) found that non-congruence between L1 and L2 FSs led to deviant FS use in about half of the FSs in his NNS data. These findings need to be interpreted with care. Studies using translation tasks (Biskup, 1992) or other methodologies that focus the subjects' attention on crosslinguistic parallels are likely to elicit errors that might be absent in more spontaneous L2 productions. Another possible bias may come from the language pairs targeted by studies. Many of the large studies on FSs have focused on language pairs involving typologically close Indo-European languages (e.g., English, German, French, and Swedish). Many of the FSs targeted have cognates in the paired language and are thus likely to show signs of L1 transfer. Some studies of English and Polish (Leśniewska, 2006; Leśniewska & Witalisz, 2007) have reported little transfer, suggesting a more minor role of transfer for languages that are more typologically distant, or are at least perceived by speakers to be distant (see Ringbom, 1987).

While adults, in at least some cases, seem to improve their knowledge of FSs (see, for example, Mochizuki, 2002), their general difficulties in non-immersion contexts may stem from a mismatch between preferred cognitive learning strategies and the nature of FSs. At this point, it becomes necessary to consider different classes of FSs. On the one hand, there are FSs that are “situationally bound utterances” (Kecskés, 2000). As Kecskés points out, such FSs (e.g., *How do you do?*) cannot always be broken down into constituent elements, and if broken down, can do more harm than good. The appropriate use of such pragmatic elements

can often be difficult to acquire in artificial classroom contexts with unrepresentative examples of language use.

Even when the FSs are not bound to particular situations, they can be difficult to acquire due to lack of salience. Unlike individual words, which are set off by white spaces in English writing, FSs do not stand out visually (Bishop, 2004b). Learners' difficulties are further exacerbated by the dual coding in the language of certain combinations that have one meaning when read as a FS, and another meaning when read based on compositional meaning (e.g. the difference between *come up with a solution* and *come up with the milk*). Bishop (2004a) has presented experimental evidence suggesting that L2 learners do not notice FSs as readily as individual words. While learners' failure in this regard may have only a minor effect on their ability to acquire form-to-form mappings through implicit associative learning, it would presumably have a devastating effect on their ability to learn FSs via explicit mechanisms (see Schmidt, 1990), mechanisms which play a prominent role in adult language acquisition (DeKeyser, 2003; Leow, 2015).

In summary, adults in a non-immersion context lack the massive input required for their implicit mechanisms to acquire the form-to-form mappings related to FSs. Faulty phonological decoding ability also leads to faulty acquisition of FSs, particularly those syllables which are phonologically less salient. The artificial nature of most instructional environments also makes it difficult to acquire FSs associated with pragmatic routines, a problem compounded by the fact that many lexical combinations are genre and register specific (David Biber & Barbieri, 2007; Henry

& Roseberry, 2007). Lastly, adults' key advantage in language learning, their ability to use explicit knowledge in learning, is compromised somewhat by the difficulty in initially noticing FSs that appear in the input. As a result, their knowledge of FSs is often imperfect and is affected by the accumulation of idiosyncratic combinations that began as productive interlanguage forms but then became fused due to repeated use. On the other hand, some research (e.g., Serrano, Stengers, & Housen, 2015) suggests that outcomes do improve somewhat when the EFL programs involve more instructional hours.

The following table presents key studies of adult FS acquisition in non-immersion contexts.

Table 4

Adult L2 Acquisition of FSs in an Instruction-only Context

Study	n	Subjects	Method	Targets	Findings
(Altenberg & Granger, 2001)		Fr. & Swedish-speaking EFL learners	Corpora analysis comparing NSs and NNSs	High-freq verbs (e.g., <i>make</i>)	Even advanced EFL Ss have difficulty with a high frequency verb such as <i>make</i> . Some of these problems are shared by the two groups of Ss (Swedish- and French-speaking learners) while others seem to be L1-related.
(Bahns & Eldaw, 1993)	58	German university Ss of Eng.	34 Ss given translation task, 24 given cloze test	V+N FSs	Similar results for both test formats FS knowledge doesn't develop alongside general lexical knowledge Weakness: Conclusion based on odd measure (i.e., comparison of non-FS translation with FS translation)
(Barfield, 2003)	93	Japanese undergrad and grad Ss	4-level acceptability judgment test	V+N FSs	FSs involving core meanings of both constituents are easiest.
(Biskup, 1992)	34, 28	34 Polish and 28 German advanced learners of English	Subjects translated 23 FSs into Eng.	N/A	Differences between the groups (due to strategies) depending on their L1. Weakness: Translation task may have promoted transfer. Weakness: Lack of reliability measures, lack of clarity regarding test instrument

Study	n	Subjects	Method	Targets	Findings
(Boers et al., 2006)	32	L2 learners of English (college)	Experimental manipulation of FS treatment to see effect on oral proficiency	N/A	Extra instruction highlighting FSs improved oral proficiency.
(Chi Man-Lai, Wong Pui-Yiu, & Wong Chau-ping, 1994)	N/A	Chinese-speaking Ss studying in China (about 2000 learners?)	Analysis of a million-word learner corpus of Hong Kong Ss' Eng. writing with errors divided between those showing confusion between delexicalized verbs and confusion with other verbs	Light verbs	Some errors seem to involve the wrong parsing of input due to the lack of phonological salience of certain forms: the use of <i>get confidence</i> based perhaps on mishearing <i>they've got confidence</i> , the use of <i>take challenge</i> for <i>take up a challenge</i> .
(Cieřlicka, 2006)	36	Advanced learners of Eng. in Poland, mostly in early 20s	Classification of Eng. idioms into those with (1) exact equivalents, (2) partially matching equivalents, (3) non-matching Comprehension task: Ss asked to write down: (1) idiom's meaning (2) thought processes, mental images, etc. (3) guess the best Polish equivalent Production task: fill in the blank Translation task: English trans. of Polish sentences with idiom omitted	Idioms	Cross-linguistic influences are significant in both comprehension & production.
(De Cock, 1998)	50	Fr. L2 learners of Eng. and NSs between age 19 and 25	Analysis of spoken corpus of NNS spoken language (25 interviews) & NS corpus (25 interviews)	Vagueness tags	NNSs user fewer FSs and fewer vagueness tags (and everything, and stuff like that, etc.)

Study	n	Subjects	Method	Targets	Findings
(De Cock, 2000)		Advanced French EFL learners of English	Comparison of NS and NNS corpus of interviewee speech Analysis of NS and NNS (from ICLE) written corpora Extraction of two- to six-word HRWCs (highly recurrent word combinations)	Repetitive chunks	NNSs overuse some combinations, underuse others, and misuse others NS writing and speech: two- to five-word sequence types and tokens more common in speech NNS writing and speech: two- to four-word sequence types and tokens more common in speech Significantly fewer 6-word types and tokens in NNS speaking NNSs tend to use more HRWCs: Lack of support for notion that NNSs tend to use more individual bricks Higher NNS use of HRWCs in writing suggests stylistic deficiencies Weakness: (Acknowledged by author) The quantitative analysis includes many phrases (e.g., <i>that the</i>) that may lack psychological plausibility.
(DuFon, 1995)	18	Ss of Indonesian studying in Hawaii	Observation and taping of 5 50-minute classes Analysis of gambits used by Ss, teacher, and textbook	Gambits	Learners of Indonesian picked up 24 of the 98 gambits that they heard. Note: 71% of reported gambits weren't FSs. Weakness: None of the conclusions are valid. Gambits used by T and textbook can't be compared to those used by Ss since the modality (speaking versus written in the case of the textbook) and social role (in the case of the T) is different.
(Farghal & Obiedat, 1995)	57	Advanced Jordanian Arabic speakers: 34 Ss & 23 Ts	Questionnaires: an Eng. 'fill-in-the-blank' version & an Arabic trans. with 22 FSs	Common FSs (generally involving adjective and noun)	Poor performance by both groups Transfer was only used around 10% of the time. Weakness: Some of the collocations targeted were a bit odd.
(Fayez-Hussein, 1990)	200	Undergrad Jordanian learners of Eng.	Fill-in multiple choice test	Idioms, fixed expressions restricted FSs	48.4% of FSs were correct. Almost half of incorrect responses were due to L1 transfer. Tendency to use generic terms accounted for 38.3% of responses.
(Foster, 2001)	64	32 NNSs and 32 NSs	Tallying of FSs in transcripts involving planned and unplanned discourse based on formalized procedure for ensuring reliability of NS's intuition (5 of 7 judges)	Sequences thought to have been stored and produced as wholes	FSs used mostly by NSs in unplanned condition followed by NSs in planned condition, NNSs in planned condition, and NNSs in unplanned condition. 42.5% of FSs in NNS unplanned condition accounted for by just 4 sequences. Most FSs used by NSs and NNSs were fillers and organizers Weakness: Sole reliance on native intuitions

Study	n	Subjects	Method	Targets	Findings
(Granger, 1998)		Fr. subcorpus of ICLE and NS corpus	Comparison of NNS and NS corpus	Intensifier adverbs (modifying adjectives) ending in ly	NNS FS knowledge tends to be limited and is often colored by L1 Underuse of amplifiers and boosters (cp. opposite finding in Lorenz 1998) Higher use of those intensifiers with direct cognates in Fr. (<i>completely & totally</i>).
(Henry & Roseberry, 2007)	40	40 Malay-speaking Ss	Error analysis of Ss' tourist brochures	Tourist brochure genre writing	Many FSs Ss need are specific to a genre. Weakness: Distinction between usage-based vs. grammar-based errors is highly subjective.
(Irujo, 1986)	12	Venezuelan advanced learners of English	Multiple choice test of 45 English idioms: 15 identical to Spanish idioms, 15 similar and 15 different Production test on same idioms	Idioms	Idioms similar to L1 easiest
(Leśniewska, 2006)	174	113 English Ss at a Polish university, 61 Ss, NSs, all mostly in early 20s	Gap completion Acceptability of FSs (from among choices)	Adjective intensifiers	Extensive use of general purpose modifiers and avoid restrictive modifiers General ability to avoid errors Little apparent L1 influence
(Leśniewska & Witalisz, 2007)	91	Advanced Polish EFL learners of English, age 20-22	2 acceptability judgment tests, one in Polish and one in Eng., with items with range of appropriateness (3 levels) and either congruent with L1 or non-congruent	Adjective intensifiers (used before <i>talented, tired, boring, offensive, critical, etc.</i>)	No apparent L1 influence Lack of clear patterns for group Judgments may be based on semantics. Ss seemed unwilling to put English words into gray area of acceptability.
(Lorenz, 1998)	N/A	German Ss of Eng. and Eng. NSs	Analysis of four corpora of NNS & British teens and adults	Adjective intensifiers	Overuse of adjective intensification due to stylistic deviations
(Mochizuki, 2002)	54	Japanese uni Ss	1 yr. study of development of FSs & pragmatic knowledge after 75 hrs of instruction Measures: vocab. size test, paradigmatic knowledge test, FS test (without context)	Two-word FSs devoid of context	Only FS knowledge improved (general word meaning seems to have greater inertia)

Study	n	Subjects	Method	Targets	Findings
(Nesselhauf, 2005)	207	German-speaking learners of English (mostly 3 rd or 4 th yr. uni Ss in German-speaking countries)	Examination of GeCLE (subset of ICLE—a learner corpus): 318 essays written by 207 learners	Over 2000 verb-noun FSs in essays	<p>FSs pose major problem for learners, even at an advanced level</p> <p>Verbs were more frequent deviant element: problems with light verbs, phrasal verbs, and prepositional verbs. Also problems with many common verbs</p> <p>Nouns: Inappropriate choice of noun; inappropriate number when this is frozen in the collocation</p> <p>Many deviant collocations were existing English collocations that were misapplied (p. 167), others involved L2 blends</p> <p>L1 influence seen in about half of deviant collocations</p> <p>Non-congruence of FS in L1 and L2 led to deviance in 50% of cases (p. 238)</p> <p>Most problematic FSs tended to be everyday expressions</p> <p>Learners used fewer FSs than NSs but the number was still significant</p> <p>Many deviant FSs created from bricks</p> <p>Time pressure led to fewer FSs but higher ratio of deviant FSs (p. 230).</p> <p>Dictionary use led to slightly more FSs.</p>
(Shih, 2000)	N/A	Taiwanese learners of English	Corpus-based study	<i>Big, large, great</i>	<p>Tendency to prefer vague terms</p> <p>L1 transfer</p>
(Wray, 2004)	1	Older British woman	Case study of woman on a TV program trying to learn a language in the span of a few days	N/A	<p>Many FSs were acquired but the woman did engage in analysis of input.</p> <p>Wray suggests that if it is in fact possible to bypass learner's analytical mode of processing language, learners might benefit from learning certain collocating forms as wholes (i.e., by not being provided with the analysis during instruction).</p>
(Zughoul & Abdul-Fattah, 2003)	70	EFL uni Ss in Jordan	Multiple choice test, translation task (results analyzed to determine strategy use)	FSs for the Arabic verb <i>kasara</i> (broke)	<p>Poor overall performance.</p> <p>Literal translation in few cases when FS's meaning used core meaning of <i>kasara</i>.</p>

Conclusions

Overall, the research discussed in this review supports the position that both age and learning environment (particularly, the availability of input) have an important effect on the role of FSs

in learners' performance and L2 acquisition. The literature on L1 acquisition of FSs provides strong support for a developmental route from memorized lexical units (including FSs) to low scope patterns. There is further support, albeit somewhat more tenuous, for the use of low scope patterns to develop rule-based knowledge. The findings are consistent with usage-based accounts (e.g., Beckner et al., 2009; Bybee, 2006; Goldberg, 2006; Tomasello, 2003; Wray, 2002) that claim that L1 learners acquire certain memorized wholes and only create rules through the force of exposure to similar types (versus tokens) of a structure or category.

Regarding early L2 acquisition in immersion contexts, the literature strongly suggests a key role for FSs in enhancing performance and enabling interaction, which in turn makes massive amounts of input available to the child's implicit learning mechanisms. Early L2 learners in a non-immersion context also manage to acquire some FSs, although this is often in the form of proceduralized knowledge (either fused interlanguage structures or patterns repeated in class). Success in transforming FSs into low-scope patterns and then fully productive patterns seems to follow the trajectory discussed in skill acquisition theory, but with individual patterns remaining associated quite often with specific lexical units for extended periods during the learning process.

Late L2 learners in an immersion context seem to retain associative learning mechanisms and are thus able to make contiguous form-form mappings based on massive amounts of input. Research suggests a role for motivation, which probably plays an indirect role in learners' obtaining adequate input. Adults, however, seem to suffer from imprecise interlanguage

phonology and syntax and thus lack L1 speakers' ability to verify congruence of a FS with the target linguistic system. The explicit mechanisms available to adults are also inappropriate for learning some FSs, particularly those that are semantically bleached. When reading, adults also find it more difficult to notice FSs, which lack orthographic salience. Late L2 learners in a non-immersion context are limited by the same problems, which are exacerbated through poverty of input; hence their acquisition is primarily focused on forms that are phonologically distinguishable and noticeable in the input (often due to the transparency of meaning).

The tentative findings of the literature review would suggest several practical implications for pedagogical practice. FSs are likely to play a major role in all successful early L2 acquisition, thus early L2 instruction should seek to maximize meaningful input to early learners. As learners in junior high and high school acquire the ability to use explicit mechanisms, learning outside of immersion contexts should include explicit instruction and practice to allow for the development of FSs and routines based on proceduralized and automatized knowledge. For older learners, massive input probably remains necessary to acquire many of the form-form mappings that are highly arbitrary. These learners should therefore be encouraged to engage in extensive reading and listening. Furthermore, specific pedagogical practices²¹ need to be developed to ensure that students notice FSs as distinct lexical units while attending to their phonologically non-salient components.

21 A good list of pedagogical techniques can be found in Nation (2001, pp. 335-343).

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