

CORRECTIVE FEEDBACK IN SECOND LANGUAGE TEACHING AND LEARNING

Bringing together current research, analysis, and discussion of the role of corrective feedback in second language teaching and learning, this volume bridges the gap between research and pedagogy by identifying principles of effective feedback strategies and how to use them successfully in classroom instruction. By synthesizing recent works on a range of related themes and topics in this area and integrating them into a single volume, it provides a valuable resource for researchers, graduate students, teachers, and teacher educators in various contexts who seek to enhance their skills and to further their understanding in this key area of second language education.

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CORRECTIVE FEEDBACK IN SECOND LANGUAGE TEACHING AND LEARNING

Research, Theory, Applications,
Implications

Edited by Hossein Nassaji and Eva Kartchava

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The collection before you is a joint effort to produce a volume on corrective feedback that speaks to both researchers and language teachers alike. While the ideas presented here are varied and many require further investigation, we hope that this collection may represent a point from which additional discussions, considerations, and questions about corrective feedback originate.

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INTRODUCTION

Hossein Nassaji and Eva Kartchava

The Role of Corrective Feedback: Theoretical and Pedagogical Perspectives

The issue of how to correct learner errors has long been of interest not only to teachers but also to researchers. Corrective feedback refers to utterances that indicate to the learner that his or her output is erroneous in some way. Chaudron (1988) defined corrective feedback as “any teacher behavior following an error that minimally attempts to inform the learner of the fact of error” (p. 150). This behavior may overtly elicit a response from the learner and hence may result in self-correction or may correct the error in ways that the learner may not realize that a response is needed. Corrective feedback can be provided both orally and in written form and in response to a range of errors, including linguistic, content, organization, and even discourse and pragmatic errors.

Although corrective feedback is considered an important aspect of second language (L2) pedagogy, there has been considerable controversy over its role and usefulness in both L2 acquisition and instruction. Theoretically, the argument for the role of corrective feedback relates closely with the notion of whether or not there is a need for negative evidence in language acquisition (Nassaji, 2015). Negative evidence is defined as information that tells the learner what is not possible in a given language. This has been contrasted with positive evidence, which refers to the information that tells the learner what is possible in a given language. Positive evidence is received mainly through naturalistic exposure to language input or input that has been modified or simplified for the purpose of comprehension (e.g., Gass, 2003; Long, 1996). Negative evidence can be obtained in various ways. It can be obtained through explanation or presentation of grammatical rules and can also be obtained in the form of corrective feedback on learner

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errors (Long, 1996). Such feedback can be provided both directly through overt correction or indirectly through strategies that signal to the learner that his or her utterance may contain an error, such as repetition of the learner error or clarification requests, confirmation checks, and other indications of failure to understand the message by the interlocutor (Nassaji, 2015).

While many researchers have argued that corrective feedback is needed and plays a crucial role in the development of linguistic knowledge, there are others who have contended that there is no need for it and that it has little impact on the acquisition of L2 knowledge. One such position, for example, is the nativist position, which posits that what drives language learning are some biologically innate linguistic principles called Universal Grammar (UG). In this view, learning becomes possible when the UG principles are triggered by exposure to instances of natural language use or positive evidence only. The role of negative evidence is downplayed because if learners have access to UG, corrective feedback hardly plays a role (e.g., Flynn, 1988, 1996; Schwartz, 1993; White, 1991). Other researchers, however, who have taken a cognitive or an interactionist perspective, have argued that corrective feedback is not only available in the L2 environment but is also necessary for successful L2 acquisition (e.g., Doughty & Long, 2003; Doughty & Williams, 1998a; Gass, 2003; Gass & Mackey, 2006; Long, 1991, 1996; Long & Robinson, 1998; Schachter, 1991). Doughty and Williams (1998b), for example, argued that “second language learning is not identical to first language learning, and so we do not consider leaving learners to their own devices to be the best plan” (p. 197).

Error correction has not only been a debatable topic theoretically; language teaching methodologies have also varied considerably regarding their stance on the role and usefulness of error correction (Nassaji, 2015). For example, Communicative Language Teaching (CLT), particularly in its strong version, has emphasized that teaching must be primarily meaning-focused with no explicit correction. This approach defines the aim of language learning as acquiring communicative ability, that is, the ability to use and interpret meaning in real-life communication. Thus, it emphasizes that teaching should also be primarily meaning-focused and based on communicative language use. The assumption is that if learners have sufficient opportunities to use the language for communicative purposes, they will be able to master the language successfully without any explicit instruction. As a result, corrective feedback is deemed unnecessary.

On the other hand, some other teaching approaches such as the cognitive code method and the focus on form approaches have emphasized the importance of error correction. From a cognitive perspective, learning is a process of creating a mental representation of the language through cognitive processes such as association, or discovering regular patterns from exemplars, and abstracting generalizations (e.g., Ellis, 1994). In this view, corrective feedback is crucial because it helps learners to construct a correct mental representation of the target language. Also, since learning takes place through problem-solving and making

and trying out hypotheses, feedback is essential as it helps learners to refine their hypothesis (Celce-Murcia, 2001; 1991). From a focus on form perspective, noticing and attention to form is required for effective language learning. In this view, corrective feedback is beneficial because it not only provides learners with negative evidence but also helps learners notice the gap between their non-targetlike L2 production and the targetlike form (Long, 1996). Since corrective feedback occurs in response to learners' errors, attention to form occurs at the time when needed. Thus, the feedback provides learners with opportunities for form-meaning mapping, required for L2 learning (e.g., Doughty & Varela, 1998; Long & Robinson, 1998).

Due to varying theoretical and pedagogical viewpoints, a considerable amount of research in both past and present has focused on examining the effects of corrective feedback on L2 learning. Empirical research in this area has been both descriptive and experimental and has been conducted in various contexts, with various learners and on various types of feedback. This research has examined a variety of issues including not only those related to whether corrective feedback assists language acquisition but also the differential effects of different types of feedback and the mechanisms underlying their effectiveness. It has also addressed a number of other key issues such as the role of peer feedback, learners' and teachers' perspectives, and the various individual learner differences. Current research has even extended this line of research by examining the effects of feedback in various technology-mediated settings and comparing these effects with those in traditional face-to-face interactions. Although there are still many questions about how and when to provide effective feedback, research has provided increasing evidence that corrective feedback plays a crucial role in second language learning and teaching. In particular, considerable research suggests that L2 learners, particularly adults, can not develop native-like accuracy based on mere exposure to models of grammatical input and that they need corrective feedback in order to acquire an L2 successfully.

The Aim of this Book

The aim of this edited volume is twofold. One aim is to synthesize recent works on a range of corrective feedback topics that have been the focus of current research, and integrate them into a single volume that can serve as a resource for those interested in error correction and feedback in various contexts. Although there are many studies on corrective feedback and their results have been published in numerous individual journal articles and book chapters, there is not yet a collection that brings together the findings of these investigations and/or discusses their implications for theory and research. This edited volume intends to fill this gap by contributing to the knowledge accumulated over the years in the various areas of corrective feedback. Another major aim is to connect theory, research, and practice. Although many studies have investigated corrective feedback, there

is clearly a missing link between the findings of this research and what is actually practiced in many L2 classrooms. Thus, this book aims to address this gap too, by identifying the principles of effective feedback and discussing how to use it successfully in classroom instruction.

To meet its goals, the book brings together cutting-edge research and state-of-the-art articles that address recent developments in theory and research on a range of core corrective feedback areas, including oral, written, and computer-assisted feedback, as well as studies of learner and teacher perceptions, the timing of feedback, and the role of non-verbal feedback. The contributors include expert researchers who have conducted research in each of the specific areas covered as well as those who have applied and tested their implications in practice. They each explore their own topic and identify the implications of their examination for classroom instruction.

The Organization of the Book

The book consists of four parts and eleven chapters. Part 1 focuses on oral feedback. Chapter 1, “Oral corrective feedback in L2 classrooms: What we know so far,” by Ellis sets the tone for the book by discussing and reviewing current research related to the five key questions posed by Hendrickson (1978): (1) Should learner errors be corrected? (2) When should learners’ errors be corrected? (3) Which errors should be corrected? (4) How should errors be corrected? and (5) Who should do the correction? The chapter concludes by examining the advice often given to teachers in light of current research. In Chapter 2, Sato examines the role of peer feedback. It explores various aspects of peer feedback including its affective, social and cognitive dimensions and how they affect the usefulness of such feedback. Among the factors, the author argues that learners’ mindset and the social dynamics of peer interaction are the two most important factors affecting the impact of peer feedback. The chapter concludes with suggestions for how to increase the efficacy of peer feedback in L2 instruction. Quinn and Nakata (Chapter 3) examine the timing of oral feedback. Feedback timing is both a pedagogically and theoretically important issue in the field of L2 corrective feedback and concerns at what time feedback should be provided to be optimally effective, for example, whether it should be provided immediately after an error is made or whether it should be provided with some delay. The chapter begins by examining the theoretical and empirical research related to feedback timing and ends with suggestions for further research and classroom teaching.

Due to the increasing use of technology in language teaching, an examination of the role of the computer in facilitating and providing feedback has recently received considerable attention. Thus, Part 2 deals with computer-mediated feedback. Chapter 4, by Heift and Hegelheimer, addresses the role of feedback in Computer-Assisted Learning (CALL). The focus is on feedback in two contexts: in tutorial CALL programs and in various Automatic Writing Evaluation

(AWE) systems. The chapter reviews research and its findings and examines their implications for classroom teaching. In Chapter 5, Storch also explores the role of feedback in computer-mediated settings, but the focus is on peer feedback when provided in computer-mediated collaborative writing tasks through online tools such as wikis or Google Docs. The chapter reviews research in these areas and discusses how such platforms could be used most effectively to promote opportunities for peer feedback. Ziegler and Mackey (Chapter 6) address the use of interactional feedback in synchronous computer-mediated communication (SCMC). The chapter provides a review of the current research in a variety of such contexts, including Web 2.0 and multi-media learning. It also discusses the similarities and differences between feedback in such settings and in face-to-face interaction. Finally, the chapter draws out the implications of such research for classroom teaching.

Part 3 deals with the role of written feedback. In Chapter 7, Tigchelaar and Polio focus on the role of peer feedback in writing. They begin by examining the existing beliefs in the literature regarding the use and effectiveness of peer feedback and then review research and its implications for classroom instruction and future research. Chapter 8 by Nassaji discusses the role of negotiated feedback in response to written errors. Being framed within an interactionist and a socio-cultural perspective, the chapter argues that in addition to written feedback oral feedback can also be used as an option to address written errors. The chapter reviews current research in this area and concludes with a discussion of its implications for classroom teaching and learning. In Chapter 9, Bitchener addresses when and how written feedback can facilitate L2 development. To this end, the author reviews various conditions that have been considered necessary for effective feedback and also the factors that can account for feedback failure. He then concludes with recommendations of this discussion for future research and classroom pedagogy.

Part 4 deals with other important issues in corrective feedback: teacher beliefs and perspectives and the role of non-verbal feedback. Li (Chapter 10) provides a combination of a meta-analysis and narrative review of research on teachers' and learners' beliefs and opinions about corrective feedback. The data were analyzed with respect to the five key questions posed by Hendrickson (1978) mentioned earlier and a number of other important feedback dimensions such as the effects of training, the relationship between teachers' beliefs and their practice, and the role of learners' attitudes on the effectiveness of feedback. Research findings related to these issues are discussed and their implications for classroom teaching are considered. The final chapter (Chapter 11) deals with non-verbal feedback. Loewen and Nakatsukasa begin by discussing how non-verbal cues can be used in classroom interaction in ways that can provide corrective feedback. With a focus on gestures, they review a number of both descriptive and experimental studies in this area and examine their implications for how teachers can incorporate non-verbal feedback into their classroom teaching. The authors argue that since non-verbal feedback does not necessitate verbal explanation, it can be used as a time-saving strategy in L2 classrooms.

The Audience

The book provides a key resource for all those interested in gaining insight into the role of corrective feedback in L2 learning and how it can be used to enhance L2 teaching. The role of corrective feedback and how it assists language acquisition is an issue of considerable theoretical and empirical importance in the field of second language acquisition (SLA). Thus, one major audience of the book is SLA students and researchers. The book helps these readers to be informed of current theoretical and empirical advances in this vibrant area of SLA research. It also provides them with a framework that can stimulate further research in this area. Since the volume provides theme-based chapters in different areas of feedback, it can be used as a stand-alone text or each chapter can be used as an independent resource. Since the treatment of learner error is also an important aspect of any second language classroom, another major audience is teachers and teacher educators as well as those in teacher preparatory or in-service professional development programs. Because the book provides a comprehensive survey of the state of knowledge in corrective feedback areas and their implications for pedagogy, it helps these readers to develop not only an understanding of the different ways in which and the means by which errors can be corrected, but also how to integrate them into classroom teaching. Finally, the chapters are written in a very accessible way and do not assume a great deal of prior knowledge. Therefore, the book will also appeal to undergraduate students in applied linguistics who do not have a strong background in SLA. By drawing on recent developments in theory and research, the book helps these readers to develop a good understanding of the nature of corrective feedback and the implications of the research in this area for second language learning and teaching.

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INTERACTIONAL FEEDBACK IN SYNCHRONOUS COMPUTER- MEDIATED COMMUNICATION

A Review of the State of the Art

Nicole Ziegler and Alison Mackey

Introduction

Numerous studies and meta-analyses have demonstrated benefits of interactional feedback for second language development (see Keck, Iberri-Shea, Tracy-Ventura, & Wa-Mbaleka, 2006; Mackey & Goo, 2007; Nassaji, 2015, 2016; Russell & Spada, 2006; Ziegler, 2016a for recent reviews). By providing negotiation and feedback opportunities, acquisition is supported through “the connection of input, internal learner capacities, particularly selective attention, and output in productive ways” (Long, 1996, pp. 451–452). These negotiations for meaning, as well as the provision of negative evidence via corrective feedback, offer opportunities for learners to identify gaps between their interlanguage (IL) and the target language (TL), as well as to produce modified output (Long, 1996; Swain, 2005), thereby providing learners with the potential to reap both receptive and productive linguistic benefits from interaction. These benefits have been found to hold for adults as well as children in a wide range of first–second language pairings and in classroom, laboratory, and naturalistic contexts (Mackey, 2012).

There is now a growing body of research examining interaction within the context of synchronous computer-mediated communication (SCMC), which also suggests positive benefits for interaction within technology-supported environments (e.g., Blake, 2000; de la Fuente, 2003; Lai & Li, 2011; Sauro, 2011; Sauro & Smith, 2010; Smith, 2004, 2005, 2010; Ziegler, 2016b). This research provides compelling evidence that interactional features found to be beneficial to L2 development in face-to-face (FTF) contexts, such as negotiation for meaning, corrective feedback, and modified output, can and do occur in computer-assisted language learning (CALL) environments as well (e.g., Beauvois, 1992; Lee, 2001). Building on previous meta-analytic and synthetic research (Mackey & Goo, 2007;

Sauro, 2011; Ziegler, 2016a), our aim in this chapter is to provide a comprehensive review of interactional feedback and technology research from the past few decades to aid the reader in understanding its development and status quo.

Interactional Features

Long's (1996) update to the original interaction hypothesis addressed the ways in which interaction provides negative evidence, which can be defined as input that provides direct or indirect evidence of ungrammatical forms. Negative evidence, which facilitates L2 development by indicating to learners that there was an issue with their language production, potentially drawing their attention to gaps between their IL and the TL, is provided through interlocutors' feedback on learners' L2 utterances (Leeman, 2003, 2007), often during the process of negotiation for meaning. Through negotiation, output can be modified to be made more comprehensible, as well as more salient (e.g. Mackey, 2012; Pica, 1994, 1996; Swain, 1985, 1995).

Overall, research has shown that receiving feedback and participating in negotiation, the concept of which has expanded in recent research to include interactional modifications occurring in response to other forms of implicit and explicit feedback, including recasts and metalinguistic feedback as well as modified output (Mackey, 2012), may support learners' L2 development by providing both positive and negative evidence. By facilitating learners' noticing of erroneous utterances and directing their attention to the TL, this provision of positive and negative evidence may prepare learners to be more observant regarding future instances of linguistic input, as well as provide them with multiple opportunities to confirm, modify, or reject hypotheses they have formed regarding the L2 (Gass & Mackey, 2007).

Interactional Feedback and Computer-Mediated Communication

Building on the idea that CALL might be developed to reflect ideal conditions for L2 development, an early position paper by Chapelle (1998) identified features of interaction that could be directly applied to instruction in a computer-mediated environment, such as making key linguistic features salient, supporting modified interaction between the learner and the interlocutor, and providing opportunities for learners to notice their errors, to modify their output, and to receive comprehensible input. Based on hypotheses regarding ideal second language acquisition (SLA) conditions, such as the importance of interaction, exposure to comprehensible input, and opportunities for output and feedback (Long, 1996; Pica, 1994). These principles were later expanded upon by Doughty and Long (2003) to include features of task-based language learning and teaching. Using Chapelle's suggestions for instructional designs as a framework to investigate the basic tenets and features of the interaction approach in CALL contexts, researchers sought to demonstrate the potential for computer-mediated

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communication (CMC) to direct learners' attention to specific target language features and to provide learners with opportunities to negotiate for meaning, to receive comprehensible input and corrective feedback, and to produce modified output (Smith, 2004).

Negotiation for Meaning in SCMC

Within the body of CALL research conducted during the early 1990s, only a few studies examined the nature of learners' interactions. For example, in her often-cited early investigation of computer-assisted class discussions, Chun (1994) examined the quantity and quality of language produced by learners of German as a foreign language. Results indicated that learners provided corrective feedback and negotiated for meaning in the form of clarification requests. Building on Chun's (1994) early work, Pellettieri (2000) examined intermediate-level Spanish learners' negotiation of form and meaning during communicative tasks carried out using text-chat. Findings indicated that the patterns of interaction were similar to those found in non-native speakers' (NNS) oral conversation, with instances of negotiation triggered by inappropriate responses or lack of comprehension. Pellettieri (2000) also found that learners used clarification requests and confirmation checks to negotiate for meaning and provided one another with corrective feedback during meaning-focused exchanges. These results led Pellettieri (2000, p. 59) to conclude that text-based SCMC provided an environment facilitative of negotiation of meaning and interaction and, importantly, that because learners in a written SCMC context may have more time to process and monitor their language, written SCMC may play a "significant role in the development of grammatical competence among classroom language learners."

Blake (2000) also used SCMC text-chat tasks to encourage negotiation between intermediate learners of Spanish, finding that these negotiations were most often triggered by lexical misunderstandings, echoing findings in the FTF interaction literature (cf. Mackey, Gass & McDonough, 2000). Similarly, in an influential early line of work, Smith (2003) examined the amount and types of negotiation occurring when learners encountered novel lexical items during jigsaw and decision-making tasks in text-chat, finding that learners do negotiate for meaning when miscomprehension occurs in a computer-mediated environment.

Research in CMC has also examined the effects of specific types of technology on the quantity and type of negotiation that learners produce. For example, Jepson's (2005) comparison found that a greater number of repair moves took place in voice chat than in text chat. Smith (2009) examined the relationship between negotiated interaction and the use of scrolling or cursor movement, with results indicating that negotiation was negatively affected by increased scrolling activity and mouse movement. Smith (2010) also investigated the relationship between learners' eye movements and uptake, while Wang (2006) took the study of interaction and technology one step further by examining the role of

visual cues, such as facial expressions or gestures, in negotiation routines during video conferences. In addition, other, more recent studies have demonstrated the potential impact of the communication mode on the provision of feedback, with learners receiving recasts in SCMC outperforming those that received feedback in FTF contexts (e.g., Yilmaz, 2012; Yilmaz & Yuksel, 2011).

However, recent meta-analyses suggest that the interaction agenda has not been pursued as thoroughly and systematically in CMC contexts as it has been in FTF contexts (e.g., Ziegler, 2016a). For example, the overall body of research specifically focusing on feedback type remains somewhat limited, and only a handful of studies have investigated the impact of implicit and explicit corrective feedback in SCMC on L2 development (e.g., Loewen & Erlam, 2006; Sauro, 2009; Yilmaz, 2012). Possibly because of this lack of variety in recent studies, the results remain mixed, with a few studies finding no differences in efficacy across recasts and metalinguistic feedback (Loewen & Erlam, 2006; Sauro, 2009) and others finding advantages for explicit correction compared to recasts on immediate and delayed posttests, as well as across production and comprehension measures (e.g., Yilmaz, 2012). Most of this research has been conducted in text-chat environments, although recently Monteiro (2014) examined the effectiveness of oral metalinguistic feedback and recasts during video-conference interactions, finding no significant differences in the development of learners' implicit and explicit knowledge across groups.

Noticing and Focus on Form in SCMC

Schmidt's well-known Noticing Hypothesis (Schmidt, 2001) posits that noticing is a necessary condition for SLA. Some scholars have suggested that SCMC might provide learners with additional opportunities for noticing, and thus more developmental opportunities than might be encountered in FTF interaction, due to the possibility of increased saliency, more opportunities to review input and output, and longer times for processing and planning production (Beauvois, 1992; Pellettieri, 2000; Smith, 2004, 2005; Smith & Gorsuch, 2004; Warschauer, 1995, 1997). This is particularly true of text-chat exchanges, as learners are presented with a written record of the interaction, which may provide added opportunities for learners to attend more closely to the form and content of the input, while still maintaining the real-time feel of conversation (Pellettieri, 2000; Smith, 2003). Because SCMC may increase learners' opportunities to notice target items in the input, as well as to notice gaps between their IL and the TL, we can speculate that it may be *more* facilitative of noticing certain target forms than FTF interaction. For example, Payne and Whitney (2002) reported that learners described noticing their mistakes more frequently in SCMC chat environments than in FTF interaction, while Sotillo (2009), Shekary and Tahirian (2006), and Blake (2005) found evidence of learners noticing the gap between their IL and the TL during text-chat interactions. Similarly, Bower and Kawaguchi (2011) found that although negotiation occurred most often due to communication problems, pro-

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viding learners with the opportunity to visually review their interaction through chat logs leads to increased rates of correction, possibly because learners' attention is directed toward their interlanguage, thereby potentially leading to improvement. Lai and Zhao (2006) also showed that text-chat resulted in improved noticing of errors and interactional feedback, providing further evidence of the possible opportunities for SCMC to enhance noticing. Finally, the results of Lai, Fei, and Roots (2008) indicated that the amount of noticing was impacted by learners' working memories or the contingency of feedback, with findings demonstrating that learners noticed 53% of contingent recasts compared to noticing only 35% of non-contingent recasts. Of course, noticing and learning are not iso-morphic, as McDonough and Mackey (2006) point out in their study of FTF interaction, where responses in the form of immediate repetitions of contingent recasts, which suggest noticing of them, were not associated with linguistic development. Nevertheless, the Lai et al. (2008) study still suggests that future research is warranted.

Besides noticing, empirical research has also demonstrated that SCMC may encourage learners to focus on form (Blake, 2000; Salaberry, 2000; Shekary & Tahririan, 2006; Yilmaz & Yuksel, 2011), as well as potentially enhancing negotiation for form and meaning (Lee, 2002). In recent years, methodological advancements and the use of eye-tracking technology have also been helpful as researchers have tried to tease apart the relationship between recasts, noticing, and uptake, providing important information regarding what learners attended to in terms of feedback during the interaction (Smith, 2010, 2012). For example, drawing on learners' eye-gaze records, Smith (2010) found that learners noticed lexical recasts more frequently than grammatical recasts, with those recasts resulting in successful uptake, leading to short- and middle-term gains. Building on these findings, Smith (2012) added stimulated recall protocols to measure learners' noticing of corrective feedback, specifically recasts, in SCMC. Results indicated that although learners had similar viewing activity for various linguistic categories, morphological target items were noticed less frequently than syntactic and semantic categories, confirming results found in FTF work. Similarly, Smith and Renaud (2013) found that learners attended to recasts targeting both lexical and grammatical items, with learners demonstrating L2 learning gains between 20% and 33% on posttests, while the results of Gurzynski-Weiss and Baralt (2014) provide further evidence for the noticing of feedback targeting lexical items over other target forms. Overall, then, these results support previous findings in FTF contexts that feedback targeting lexical items was noticed more than feedback on other types of target items (e.g., Mackey, Gass, & McDonough, 2000; Nabeiv & Swain, 2002).

Researchers have also argued that learners seem to notice instances of negotiation significantly more in SCMC than in FTF contexts (Yuksel & Inan, 2014). However, on this topic, studies have produced conflicting results, with some finding no differences in terms of the amount of noticing across modes of interaction (e.g., Ziegler, in press). For example, Gurzynski-Weiss and Baralt (2014, 2015)

found that there were no differences across SCMC and FTF modes in terms of noticing, a finding potentially attributed to the additional time for writing, reading, and processing messages in text-based SCMC contexts. In 2011, Baralt and Gurzynski-Weiss reported that learners in SCMC environments spent more time on tasks than those in FTF interactions, arguing in a later study that the additional time required to complete SCMC tasks is allocated to task completion rather than focus on form (Gurzynski-Weiss & Baralt, 2014). However, the results of Gurzynski-Weiss and Baralt (2015) also indicated that partial modified output was a greater predictor of noticing in text-based SCMC than in FTF interaction, suggesting that the available opportunities for learners to visually compare erroneous utterances with modified output might be important in noticing. Again, more research is needed to better understand these interesting trends.

Interlocutor Characteristics and Interactional Feedback in SCMC

Research has also examined the role an interlocutor may have in negotiation, with studies investigating how interactions between native or non-native speaking interlocutors might impact noticing (Sotillo, 2000) and negotiation in web-based chat programs (Toyoda & Harrison, 2002; Tudini, 2003). For example, Toyoda and Harrison (2002) found that the provision of feedback during synchronous text-chat interactions in an online virtual university campus environment led learners to produce output modified by both native speaker (NS) and NNS interlocutors.

Tudini (2003) also investigated learner and NS dyads, examining whether text-chats between NNSs and NSs of Italian provided negotiation opportunities during open-ended tasks. Results indicated that negotiation for meaning and modified output opportunities occur in synchronous CMC, with NS interlocutors also providing instances of corrective feedback during the interactions. More recently, Bueno-Alastuey (2010) examined the impact of dyad composition on pronunciation in video chat, finding that learner dyads with different L1s seem to be the most beneficial for improving L2 pronunciation in terms of modified output and achievement, although improvement was also found for learner dyads with shared L1s. Overall, results suggest that dyads consisting of learners with different L1s may participate in more negotiation and produce more modified output than learners interacting with NSs or learners with the same L1, a finding that classroom instructors have long understood to be true.

Interactional Feedback, L2 Development, and the Use of New Technologies in SCMC

Although the initial investigations in CALL sought to describe interactional features and feedback, focusing on observational studies of discourse in CMC, the last few decades have yielded a rich body of empirical evidence demonstrating the efficacy of interactional features in computer-mediated environments, with

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studies demonstrating positive benefits for a wide range of L2 skills, including comprehension (e.g., Yanguas, 2012), vocabulary (e.g., Smith, 2004), proficiency (e.g., Payne & Whitney, 2002), and the quality and quantity of pragmatic strategies (e.g., Sykes, 2005, 2014). For example, findings have demonstrated the positive benefits of interaction in text-based SCMC in terms of improved grammatical competence (e.g., Sauro, 2009), more complex language (e.g., Böhlke, 2003; Kern, 1995; Kitade, 2000; Warschauer, 1995), and increased accuracy (Salaberry, 2000). Research has also found opposing trends, with some studies finding no differences across modalities (e.g., Gurzynski-Weiss & Baralt, 2015; Parlak & Ziegler, 2016). These findings suggest that although modality may sometimes play a role, other factors, such as individual differences, may also be mediating factors (Sauro, 2012).

More recently, research has sought to investigate the effects of a wider range of technologies, web applications, and tools, including audio and video chat programs such as Skype, FaceTime, and Google Hangouts. Although the body of research examining oral chat is still somewhat small, this is clearly an area of growth and requires further investigation. For example, Bueno-Alastuey (2010, 2013) found that interaction in synchronous video chat had positive effects on learners' pronunciation by encouraging negotiation, noticing, and the production of modified output. However, some studies report differences in negotiation patterns between audio and FTF or video interactions (Parlak & Ziegler, 2016; Yanguas, 2010), while others report advantages for audio SCMC over video SCMC or FTF for comprehension, as well as no differences across modality in terms of oral production (Yanguas, 2012). More recently, in their longitudinal investigation of the efficacy of recasts during video-based interactions, Saito and Akiyama (*in press*) found significant gains in English learners' comprehension, fluency, and lexical and grammatical skills. However, they report no significant improvements in terms of accentedness and pronunciation. In another study, Akiyama and Saito (2016) examined the benefits of video-based interaction and corrective feedback on L2 learning outcomes. Results indicated benefits for vocabulary and grammar, although fluency and comprehensibility of speech did not significantly improve. These mixed results highlight the need for further research in these areas, as the impact of modality on L2 learning outcomes remains unclear. Replications also need to be carried out so that results are directly comparable (cf. Mackey, 2012).

Research has also examined the efficacy of Web 2.0 tools, such as social media and forums. These tools are interaction driven, highlighting the important role that interactional features, including feedback, negotiation, and output, are likely to play in L2 instructional contexts utilizing these technologies. These technologies offer opportunities for increased learner interaction, including negotiation and feedback provision, as well as opportunities to produce output in the target language (Baten, Bouckaert, & Yingli, 2009; Lee, 2006; Peterson, 2006). For instance, multiuser object-oriented (MOO) collaborations have been shown to provide opportunities for interaction and negotiation (Schwienhorst, 2004).

With the potential to extend the benefits found in MOOs, multiuser virtual environments (MUVEs) allow learners to use both voice and text-chat in a 3D virtual world, thereby increasing the options available to learners for opportunities to receive feedback and participate in negotiation. In addition, MUVEs offer learners the option to use avatars to communicate with other learners through real-time chat and gestures, potentially enhancing motivation, participation, willingness to communicate (Peterson, 2012), and production (Cooke-Plagwitz, 2008). Research has demonstrated that learners in the 3D virtual world of Second Life actively participated in interaction and negotiation for meaning (e.g., Zheng, Li, & Zhao, 2008), although some authors note that the context-specific tasks might influence the quantity and quality of the interaction (e.g., Jauregi, Canto, de Graaff, Koenraad, & Moonen, 2011). These results are similar to those of Peterson (2006), who found that task type affected negotiation, with decision-making tasks resulting in the most frequent negotiation.

Overall, Web 2.0 technologies offer researchers fertile grounds for examining interaction and L2 development, particularly regarding collaborative and community-based learning, in which learners can form structured networks and create theme-based groups to support learning and interaction. Since many of these tools are already an indispensable aspect of many learners' daily lives (McBride, 2009), educators may find their students more receptive or enthusiastic to L2 instruction situated within these contexts. Interestingly, a potential obstacle to the contribution of Web 2.0 technologies to L2 development is Google Translate, as well as similar apps and products. Although translation tools may be used to support L2 learning outcomes, such as the development of vocabulary and grammar, as automatic speech recognition and translation improve, the authentic, real-world communicative need for learners to interact in an L2 might decrease in virtual and online environments, thereby reducing the opportunities for negotiation and feedback.

Comparing Interactional Feedback in FTF and SCMC

Research has also made direct comparisons between interaction in FTF and SCMC to examine whether there are interactional similarities between the two modes. For example, research has successfully demonstrated that both contexts provide learners with opportunities to negotiate for meaning (Fernández-García & Martínez-Arbelaitz, 2002) and provide an environment facilitative for corrective feedback, including recasts (Lai & Zhao, 2006). In one of the first direct comparisons of FTF and computer-mediated interaction, de la Fuente (2003) investigated whether interaction occurring in SCMC was as effective as FTF interaction in promoting receptive and productive lexical knowledge. Results indicated that learners in both the FTF and SCMC groups demonstrated receptive and productive gains in L2 vocabulary development, although findings suggested that FTF may be more beneficial for immediate oral productive acquisition. However, in

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order to maintain comparability between modes, de la Fuente (2003) imposed strict limits on the time permitted for negotiation. This takes away from the essential nature of SCMC and may have played a role in inhibiting learners from taking part in the negotiations necessary to successfully notice and acquire the target forms. As previous research has suggested that SCMC negotiations are likely to experience potentially extended delays between triggers and indicators (e.g., Lai et al., 2008; Smith, 2003, 2012), these temporal restrictions may have impacted the results. For instance, there is a short time delay in text-chat between the initiation of the utterance and its receipt by the interlocutor. More importantly, SCMC does not adhere to the same pattern of turn adjacency found in FTF interaction. Rather, negotiation triggers may be followed by an indicator, but are initially unaddressed, only to be answered later after a repeat indicator in subsequent turns. These delays between triggers, indicators, and responses are referred to as a split negotiation routine (Smith, 2003), and highlight the possibility that negotiation and the efficacy of feedback may be hampered by time restrictions due to the complex nature of split negotiation routines in SCMC.

Comparative studies between SCMC and FTF environments have also provided encouraging evidence for the use of technology in the classroom. For example Murphy (2011) examined the role of corrective feedback provided during social interaction in asynchronous and synchronous chats. Results suggested that feedback contributed to learners' improved confidence and self-evaluation, while the social aspects served as a source of motivation for students, demonstrating the positive impact of SCMC on affective factors.

Similar to FTF interaction research (Keck et al., 2006; Mackey & Goo, 2007), lexical items have also been found to be more facilitative of negotiation than grammatical items in SCMC (Blake, 2000; Fernández-García & Martínez-Arbelaitz, 2002; Pellettieri, 2000; Tudini, 2003). For example, Pellettieri (2000) found instances of negotiation were triggered more frequently by lexically related rather than grammatically related communication problems, with the same results reported by Tudini (2003). In addition, de la Fuente's (2003) results indicated that learners in both FTF and SCMC negotiated interaction groups demonstrated greater comprehension of lexical items than learners in a non-negotiated interaction group. Long (2007) has also argued that the type of target form may be an influencing factor on the effectiveness of interactional feedback in facilitating L2 development. The results of Mackey and Goo's (2007) meta-analysis, which suggest that interaction was more effective in supporting lexical development than grammatical development, provide further evidence that learners may participate in negotiation more frequently regarding lexical items than grammatical items. Overall, these findings indicate that oral FTF interaction and SCMC display many of the same features and learning outcomes, with learners receiving similar opportunities for negotiation and feedback in both contexts.

Although some researchers have pointed out the differences between FTF and SCMC interaction, such as in structure or turn-taking patterns (Smith, 2004;

Toyoda & Harrison, 2002), other researchers have argued that because learners are still able to receive and produce visual and situational cues in video SCMC, it provides similar social signals as in FTF interaction (Lee, 2007). Although research has found similarities in performance across learners in video SCMC and FTF contexts, these similarities do not seem to extend to audio SCMC interaction. For instance, research has demonstrated differences in learners' negotiation patterns between in audio interaction and in FTF or video interaction, a difference attributed to the lack of visual input in the audio SCMC group Yanguas, 2010. Yanguas' findings also suggest that overall interactional patterns in oral SCMC were more similar to those found in FTF contexts than those of written CMC, indicating that there are important implications of restricting learners' input to aural or literal forms. However, learners' performance on listening comprehension measures indicated advantages for audio SCMC contexts over video SCMC or FTF contexts (Yanguas, 2012), suggesting that there may be positive benefits to audio conferencing for some measures over other forms of SCMC. Overall, more research is needed to determine the relative effectiveness of aural and visual forms of SCMC on learners' written and oral production and recognition.

Pedagogical Implications

As the use of technology in the classroom continues to grow, methodologically sound, well-grounded, relevant research can be used to responsibly inform educational practices. Perhaps most relevant for the classroom, empirical findings suggest that overall, teachers should not be concerned about negative effects in terms of how interactional feedback is experienced during the processes of SCMC. In other words, learners participating in interaction in computer-mediated contexts will have similar or possibly improved opportunities to benefit from negotiation, feedback, noticing, and focus on form. These findings are particularly important for distance-learning programs, suggesting that participating in computer-mediated contexts means that learners are likely to experience positive developmental benefits associated with FTF interaction. In addition, research has demonstrated benefits for both oral and written skills development, as well as receptive and productive learning. Overall, these results are highly encouraging, as they provide evidence for the wide-ranging efficacy of interaction in SCMC. The positive benefits associated with interaction in SCMC in lexical, grammatical, and phonological skills, ranging from measures of overall proficiency to assessments of individual target items, illustrates the potential applications of SCMC in promoting L2 learning outcomes and they give instructors encouraging evidence that CMC can be successfully used independently or as a supplement to FTF within the classroom. Furthermore, when interpreted alongside other important descriptive or observational findings in the field, such as those indicating the SCMC may promote more equal participation (e.g., Chun, 1994; Kern, 1995; Warschauer, 1995) or reduce anxiety (Abrams, 2003; Kelm, 1992),

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instructors may find that the integration of SCMC components into their classrooms is likely to provide learners with numerous linguistic, pragmatic, affective, and communicative benefits.

The availability of technology provides educators and researchers with unique opportunities to not only integrate cutting-edge technology into the L2 classroom, but to pursue research agendas that are continuously pushing the boundaries of CALL and how it might facilitate L2 development. Instructors seeking to integrate SCMC technology into their classrooms today have many free options, including video, audio, and text-chat products as well as Web 2.0 tools, that are likely to appeal to a range of students. Instructors interested in incorporating technology into the L2 classroom can be encouraged by the empirical results suggesting that SCMC need not be restricted to distance learning contexts, but can be integrated successfully into more traditional classroom settings to support and enhance learners' L2 development.

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