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Reformulation: the cognitive conflict and L2 learning it generates

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This paper provides evidence of the role of cognitive conflict in the process of learning a second language. Twelve grade 7 French immersion students participated in a multi-stage task that provided them with the opportunity to discuss the reformulation of a text they had written. Through a pre-test and post-test design, it is demonstrated that the reformulation of the students' own writing, an opportunity to notice the changes, and a subsequent stimulated recall provided opportunities for learning: they presented the students with cognitive conflicts that prompted the students to articulate differences between the two texts and discuss the reformulation. The students were also interviewed, which provided insights into their own learning experiences.

Theoretical background

Cognitive conflict as a site for learning

The data in this paper are part of a program of research that has focused on the roles of output (i.e. speaking and writing) in second language learning (e.g. Swain 1985, in press; Swain and Lapkin 1995, 2002, in press). In recent years, there has been a shift in the way we view output. A sociocultural theory of mind, a theoretical orientation relatively new to the field of second language research (e.g. Lantolf and Appel 1994), has prompted us to think of output not only as a product or message to be conveyed but also as a cognitive tool that mediates second language learning (Swain 2000, in press; Swain and Lapkin in press). Therefore, like Vygotsky and many others (Wells 1999), we view learning as a social process which occurs in interaction with others and with oneself.

In social interaction, and hence in learning, people can experience cognitive conflicts (Amason et al. 1995; Tocalli-Beller 2003). As Engestrom (1999, cited in Daniels 2001: 9) points out, in the school environment conflicting perspectives can be the "motive force of change and development". A cognitive conflict is an intellectual conflict; it is issue-oriented, and it enhances learning

as it usually leads to the discussion of different points of view. To our knowledge, there has been little direct investigation in L2 research of cognitive conflicts and the learning that they may generate.

Unlike in the L2 literature, in L1 studies about mathematics or science pedagogy, cognitive conflict has frequently been discussed as an instructional strategy to promote conceptual change and learning (Dale 1993; Groves 1997; Horn 2000; Limón 2001; Mugny and Doise 1978). Often conflict is induced by presenting information that contradicts students' ideas, beliefs or theories. For students to reach a stage of meaningful conflict, the problem and the topics introduced have to be relevant to them. As argued by Limón (2001), this means that students need to feel the curiosity and be motivated in the activity. Furthermore, reasoning abilities are required. If students do not have the reasoning abilities to resolve the conflict, to evaluate differences and realise that there are contradictions, they will be unlikely to reach a resolution to their cognitive conflict. In sum, for a cognitive conflict to be effective, students should realise that the information presents something different from what they know, do or believe (and, in order to improve their output, that they need to change to some extent); that is, some metacognitive awareness seems to be necessary, as well as students' willingness to consider the change (Limón 2001). For example, when students' writing is reformulated, they are presented with a change, which they need to acknowledge or notice and understand for the reformulation to have an impact on their learning.

Limón (2001) identifies the steps that the usual cognitive-conflict research paradigm involves:

a) identify students' current state of knowledge;
b) confront students with contradictory information which is usually presented through texts and/or interviewers who make explicit the contradiction or guide the debate in which the conflicting perspectives arise;
c) evaluate the degree of change between students' prior ideas or beliefs through a post-test measure after the instructional intervention.

As shown in Table 1, the design of our study has done this by taking the following steps (explained in detail further below):

a) we evaluated the students' current knowledge of French based on a text they wrote;
b) by means of a reformulated text, a noticing session and a stimulated recall, we presented students with a different text, which created cognitive conflicts;
c) by having students rewrite their text and comparing it with their original text, we were able to measure the effect of the cognitive conflicts as reflected in the students' dialogues.

Table 1. Cognitive-conflict paradigm and study design

Cognitive-conflict research paradigm (Limón 2001)	Design of our study
(a) **Identifying students' current state of knowledge.**	**Stage 1 – Writing**: Through the writing of a text, we evaluated the students' current knowledge of French. Students worked either as pairs or individually.
(b) **Confronting students with contradictory information** which is usually presented through texts and/or interviewers, who make explicit the contradiction or guide the debate in which the conflicting perspectives arise.	*Reformulation*: A native speaker of French reformulated the students' texts. **Stage 2 – Noticing**: Pairs and individuals compared their text to the reformulation and noticed the changes. This session was videotaped. **Stage 3 – Stimulated Recall**: The researchers showed the videotape to the students, stopping at each feature they had noticed. Students commented on the changes. In some cases students questioned the authority of the reformulated text and thus faced a cognitive conflict.
(c) **Evaluating the degree of change** between students' prior ideas or beliefs through a post-test measure after the instructional intervention.	**Stage 4 – Post-test**: By having students rewrite their texts individually we were able to measure the effect of the students' dialogue, reflecting their cognitive conflicts. **Stage 5 – Interview**: Students provide insights about their own learning experiences.

Reformulation as a source of cognitive conflict

As defined by Cohen (1982: 4), reformulation is a technique that requires "a native writer of the target language to rewrite the learner's essay, preserving all the learner's ideas, making it sound as native-like as possible". Swain and Lapkin (2002) show how the reformulation of the writing of a pair of students (Nina and Dara, who are also included in this article) became an effective technique for stimulating noticing and reflection/discussion about the language they used, and for promoting discussions on their beliefs and

theories of how language works. In the Swain and Lapkin study, the students themselves point out the need to discuss and solve the cognitive conflict that arose when comparing their original text to the reformulated one: "Ok, they changed something. So that's why it's better to have the person like, talking to you about the corrections that they've made" (Dara, interview).

Inevitably for second language learners the reformulated text provides changes that improve what they have written. That is, more accurate and appropriate language is used to correct the students' writing. As noted previously, for the changes to be effective and have an impact on the students' learning, students need to acknowledge and be willing to consider those changes. Therefore, when the reformulation is followed, as in this study, by a noticing session (in which students compare their original text to the reformulated version) and a stimulated recall session (in which students talk about the changes noticed), it is more likely that the students' language production will improve (Adams 2003; Lapkin, Swain and Smith 2002; Nabei and Swain 2002; Qi and Lapkin 2001; Schmidt 1990). In our study, even when conflict was generated by the reformulated text, students personalised this text, seeing it as being generated by the researchers who were conducting the stimulated recall interview. Therefore, they often addressed their disagreement to the researchers (who were not the reformulators) and tried to engage them in the discussion.[1] As suggested by Allwright, Woodley and Allwright (1988), what learners can tell us about the changes made in their writing is relevant and insightful. In a replication of the Swain and Lapkin (2002) study, Adams (2003) found that the stimulated recall itself had an impact on learning. Unlike Swain and Lapkin, Adams was able to single out the effect of the noticing session from the stimulated recall session and showed that the latter led to an increased accuracy on certain post-test items. The verbalization inherent in the stimulated recall involved questioning and explanation that the noticing alone did not. That is, the reformulation which brought about a cognitive conflict gave students an opportunity to advance their understanding of the target language by not only producing talk but also by causing them to reflect on the language production itself.

Metatalk is the kind of language used for such reflection, and it mediates second language learning (Lantolf 2000; Swain 2000) because it supports the process of appropriation. When speaking, we are usually involved socially with others. Speech is initially an exterior action which regulates others and is regulated by others. Over time, however, what takes place socially becomes part of the self as the individual appropriates the regulatory actions s/he participated in. That is, what happens and/or is said in the social domain moves inward to become part of the individual's cognitive processes and knowledge.

From a sociocultural point of view, speaking (as well as writing) is a cognitive activity through which thought is externalized and completed (Vygotsky 1978). This thought then becomes "an object that can be scrutinized, questioned, reflected upon, disagreed with, changed or disregarded" (Swain

and Lapkin in press). Therefore, when given the chance to reflect about language and discuss its use, students are given the opportunity to acquire and/or reinforce knowledge. Put simply, through the process of output (i.e. speaking or writing) knowledge is created (Swain 1997).

In view of the foregoing discussion, the present study will address the following research questions:

1) What happens when the reformulation leads to a cognitive conflict episode, i.e. when the students question and sometimes disagree with the reformulation during the stimulated recall?
2) What impact, as measured by the post-tests (relative to the pre-test), do cognitive-conflict episodes (CCEs) have on second language learning?
3) What insights do the students offer in their interviews about the CCEs prompted by the reformulation and the discussion they generated?

Methodology

Research context and design

The data presented in this paper come from 12 grade 7 French immersion students who participated in a multi-stage task over a period of two school weeks. There were five stages to the task. Four of the students completed this multi-stage task individually and eight of them worked in pairs. As is shown in Table 2, some of them were assigned a jigsaw task, which presented a visual stimulus, and some of them were given a dictogloss task, which presented an auditory stimulus; both tasks were based on the same story (see Lapkin, Swain and Smith 2002 for details and Appendix A for the actual tasks).

The stages/sessions of data collection were as follows.

Stage 1 – Writing: The students watched a five-minute videotape. The video included a short grammar lesson focusing on pronominal verbs in French (e.g. *se laver*), modelled what the students needed to do in the writing stage, and presented a story. Then, as modelled in the video, the students worked

Table 2. Stimulus task and student assignment

	Individuals	Pairs
Auditory Stimulus – Dictogloss	Emma Sue	Jim and Anna Sam and Marnie
Visual Stimulus – Jigsaw	Neil Kristy	Nancy and Monica Nina and Dara

either collaboratively or individually to reconstruct the story based on either the visual or auditory stimulus. The texts they produced were reformulated by the same adult native speaker of French, who was not present during data collection, in preparation for Stage 2. The reformulator was not given access to the original text because we wanted her to work from the meaning of the students' texts, not from her memory of the meaning of the original text.

Stage 2 – Noticing: Two to three days after Stage 1, each student or pair of students was asked to compare the text they had written to the reformulated one and to notice the changes made in the new version. At this stage, students were not asked to verbalize their thoughts about the changes. The noticing session was videotaped and audiotaped, and the students were aware of this.

Stage 3 – Stimulated recall: Prior to this stage, the research team[2] watched the video of the noticing stage (Stage 2) to locate the episodes in which the students verbalized or marked the changes and/or differences between the two texts (our definition of noticing). During Stage 3, which took place 2 to 3 days after Stage 2, the researchers showed the videotape to the students, stopping at each feature the students had noticed and asking them to comment on those changes, and in particular asking them what they were thinking at the time they noticed the change. Even when students recognised the 'expert' input of the reformulation, they sometimes questioned the authority of the reformulated text. In this sense, they faced a cognitive conflict in which what they had written had been changed, and because they did not agree with the change, or were not sure why the change had been made, discussion ensued. Stage 3 was also videotaped and audiotaped for analyses.

Stage 4 – Post-test: Each student was given their original story and was asked to rewrite it individually (regardless of whether they had worked in pairs before) by making any changes they thought necessary to improve the text.

Stage 5 – Interviews: Students were interviewed individually by one of the graduate student research team members to elicit their perceptions about all the stages and their insights about their own learning experiences. We videotaped and audiotaped each interview for analysis.

In this article we will concentrate on Stage 3, the stimulated recall, and examine those episodes in which the students faced a cognitive conflict. We call these episodes cognitive-conflict episodes (CCEs). We will examine the dialogues of students as they question and sometimes disagree with the expert feedback of the reformulation. We will also show the importance of these CCEs to language development by relating them to the students' post-test performance.

Data analysis

Stages 1, 2 and 3 were coded for language-related episodes (LREs). As defined by Swain and Lapkin (2001), an LRE is any part of the student discussion (with others or with themselves) where learners talk about the language they are producing or produced, question or reflect on their language use (and/or knowledge), or correct themselves or others. Depending on the linguistic focus, there were three types of LREs: lexical, form, and discourse. Within these types, there were subcategories (e.g. noun, preposition + article, sentence structure), which represent the focus of the students' attention and discussion.

Based on information found both in Stage 2 (noticing) and Stage 3 (stimulated recall), the stimulated recall protocol was also coded in terms of whether the students agreed or disagreed with the reformulation. That is, an LRE in which the students disagreed with the reformulation was labelled a CCE. The students' disagreement with the expert feedback was challenging and risky, yet, as we will see, this did not prevent them from questioning authority, and in doing so learning from the discussion.

Findings

Findings for questions 1 and 2

This section will address our first two research questions by presenting both qualitative and quantitative findings. These questions are:

1) What happens when the reformulation leads to a cognitive conflict episode, i.e. when the students question and sometimes disagree with the reformulation during the stimulated recall?
2) What impact, as measured by the post-tests, do cognitive conflict episodes (CCEs) have on the learning of the students who question the reformulation?

Quantitative overview of CCEs

For this study, it was decided that one pair of students, Nancy and Monica, would do the stimulated recall individually. During the noticing stage, Nancy did not talk much; therefore the research team thought that by giving her the opportunity to be alone for Stage 3, it would be easier for her to engage in discussion. This is why there are a total of 9 rather than 8 stimulated recall sessions (4 from students who worked individually and 5 from students who worked in pairs). Of a total of 104 LREs that we coded in the stimulated recalls, 21 represented CCEs where students questioned the reformulation made by the adult native speaker. That is, students questioned 20% of the

Table 3. Percentages of CCEs and non-CCEs per student/pair of student

Student	LREs				
	CCE		Non-CCE		Total
	number	%	number	%	
Neil	1	*5*	20	*95*	21
Sue	3	*20*	12	*80*	15
Kristy	1	*12*	8	*88*	9
Emma	1	*20*	4	*80*	5
Jim + Anna	1	*12*	8	*88*	9
Sam + Marnie	2	*20*	8	*80*	10
Monica	0	*0*	10	*100*	10
Nancy	0	*0*	3	*100*	3
Nina + Dara	12	*55*	10	*45*	22
Total	21	*20%*	83	*80%*	104

reformulations that they noticed in Stage 2 as evidenced by their discussions during the stimulated recall session (Stage 3). As shown in Table 3, except for Nancy and Monica, all of the students questioned at least one reformulation.

Most CCEs were provoked by errors the students made in the writing stage (pre-test) which they noticed during Stage 2 (noticing). As shown in Table 4, except for one pair of students, Nina and Dara, no CCE led to a wrong answer in the post-test. In the case of Nina and Dara, several CCEs (approximately one-third) did not lead to the right answers.[3]

When students accepted a reformulation, suggesting that no cognitive conflict existed, they still, in some cases, made the same mistake in their post-test. For example, when Monica was given a chance to review the wrong form of the verb *partir* in the original text, she said: "In ours we put *parte* and here you put *part*. So again, the feminine and the masculine of the word". She accepted the change provided by the reformulation but stated the wrong reason for the change (she thought it was an adjective, but it was a verb) without challenging the change or giving it further thought. In the post-test, she still used the wrong form, *parte*. The majority of the incorrect post-test answers (84%) come from non-CCEs in which the reformulation did not prompt the students to question either what they had originally written or the alternative provided in the reformulation. What would have happened if in these cases students had questioned the reformulation? Based on the results shown in Table 4 (Nina and Dara excepted), the chances are that students would have understood and appropriated the change.[4]

Furthermore, as we will see in some examples below, in a majority of cases (64%) a CCE generated changes in the post-test that were exactly the

Table 4. Correct and incorrect post-test answers per CCE and non-CCE

Student		Correct			Incorrect			Totals
		CCE	Non-CCE	Total	CCE	Non-CCE	Total	
Individuals	Neil	1	18	19	0	2	2	21
	Sue	1	10	11	0*	4	4	15
	Kristy	1	6	7	0	2	2	9
	Emma	1	2	3	0	2	2	5
Pairs	Jim	1	5	6	0	3	3	9
	Anna	1	6	7	0	2	2	
	Sam	2	8	10	0	0	0	10
	Marnie	2	8	10	0	0	0	
	Nancy	0	1	1	0	2	2	3
	Monica	0	4	4	0	6	6	10
	Nina	10	9	19	2	1	3	22
	Dara	7	10	17	3	2	5	
Totals		27	87	114	5	26	31	104
Percentages		24%	76%	100%	16%	84%	100%	

* Sue was involved in 3 CCEs, but at the time of the post-test, 2 of the items that originated in the CCEs in the stimulated recall were avoided and not used in the post-test.
NB: Even when students worked in pairs, they completed the post-test separately and therefore all students are considered as individuals in this table. However, following the analysis of Table 3, for the grand total in Table 4, CCE and non-CCE episodes are counted by pairs (except for Monica and Nancy, who did their stimulated recall separately).

same as the alternative offered by the reformulation. In the other cases (36%), students made changes which, though not identical to the reformulation, were acceptable and correct answers. This is shown in detail in Table 5.

A cognitive conflict was manifested in the questioning and/or disagreement in the dialogue students engaged in during the stimulated recall. A cognitive conflict generated more talk during this stage than accepting and agreeing with the changes made. As indicated in Table 6, on average there were more turns per CCE (10.24) than per non-CCE (6.12).

Qualitative analysis of 6 CCEs

We have selected 6 representative CCEs for qualitative analysis. Through these CCEs we will examine the talk that took place and link this talk to what students wrote in their post-tests. Extracts 1 to 6 provide examples of

Table 5. Percentage of matching correct post-test answers generated by CCEs

Students		Matches reformulation		Acceptable		Totals
		number	%	number	%	
Individuals	Neil	14	*74*	5	*26*	19
	Sue	7	*63*	4	*37*	11
	Kristy	4	*57*	3	*43*	7
	Emma	3	*100*	0	*0*	3
Pairs	Jim	3	*100*	3	*0*	6
	Anna	5	*71*	2	*29*	7
	Sam	6	*60*	4	*40*	10
	Marnie	8	*80*	2	*40*	10
	Nancy	1	*100*	0	*0*	1
	Monica	3	*75*	1	*25*	4
	Nina	11	*58*	8	*42*	19
	Dara	8	*47*	9	*53*	17
Totals		73	*64%*	41	*36%*	114

Table 6. Average number of turns in CCEs and non-CCEs

Student	CCE			Non-CCE		
	no.	turns	turn/CCE	no.	turns	turn/CCE
Neil	1	5	5	20	65	3.25
Sue	3	10	3.33	12	58	4.8
Kristy	1	7	7	8	44	5.5
Emma	1	5	5	4	20	5
Jim + Anna	1	15	15	8	65	8.12
Sam + Marnie	2	25	12.5	8	76	9.5
Monica	0	0	0	10	69	6.9
Nancy	0	0	0	3	16	5.33
Nina + Dara	12	148	12.3	10	95	9.5
Total	21	215	10.24	83	508	6.12

some of the CCEs that the students engaged in. The heading of each extract indicates whether the example is from a pair or an individual and the type of task involved. It also indicates the type of CCE as coded by the language-related episode type and category. For example, *CCE lexical–adverb* indicates that this episode stems from a lexical language-related episode in which the adverb used by the students was changed by the reformulator. The headings

Extract 1. Jim and Anna's CCE *sonnerie*

Dictogloss pair: Jim and Anna, CCE lexical–noun			
Stage 1		Pre-test	Reformulation
		(le) réveille	***(la) sonnerie***
Stage 3 – Stimulated Recall	62. R1:	Right. Ok. And then with *sonnerie* you you have *réveille*. So . . .	
	63. J:	**The the uh because I'd heard *le réveille* on the film [video] before. And so I thought it was *réveille* uh, like the wake up call or something.**	
	64. A:	Um-hum	
	65. R1:	So it was something that you remembered hearing?	
	66. J:	Yeah	
	67. R1:	Ok. So xx [noise on the tape]	
	68. J:	'Cause you see here [reading from their text] *quand le réveille sonne*. So I thought it was always *réveille*, **I didn't hear that he said *sonnerie*.**	
	69. R1:	Do you think it's better this way?	
	70. J:	Uh . . . *éteint la sonnerie*?	
	71. R1:	Um-hum	
	72. J:	*Eteint* would be better but **I am not sure about the *sonnerie*.**	
Stage 4 – Post-test		Jim	Anna
		(la) ***sonnerie***	*(le)* ***sonnerie***

also present what the student(s) initially wrote (pre-test item) and its reformulation. Below these, the CCE excerpt is presented, followed by how the student(s) wrote the linguistic item in Stage 4 (the post-test item).

In Extract 1, Jim and Anna are discussing the change to *sonnerie* made by the reformulator. In turn 63, Jim questions the reformulation because he is sure that he had heard what they wrote in their original text (*réveille*). Anna does not engage in the discussion except to agree with him in line 64. In fact, they did hear *réveille* in the model video, but the native speaker reformulator changed it to *sonnerie*.[5] This change to a new lexical item did not convince Jim, who states his disagreement in turn 68. In the following turn, the research assistant gives him the opportunity to re-evaluate their original choice, but it becomes evident in turn 72 that Jim is still not convinced about the new lexical item, as he explicitly says he is not sure about this change. Yet, in his post-test, he makes the change, which matches exactly the reformulation. Anna, though not overtly involved in this CCE, appears to have appropriated Jim's CCE and also includes the lexical change in the post-test (though she uses the wrong article).

Extract 2. Neil's CCE *les cheveux*

Individual Jigsaw: Neil, CCE form–pronoun/article			
Stage 1		Pre-test	Reformulation
		ses cheveux	***les cheveux***
Stage 3 – Stimulated Recall	79. R1:	I did have one little question. Where it's changed from *ses cheveux* to *les cheveux*.	
	80. N:	Yeah.	
	81. R1:	Why would that be?	
	82. N:	Well, *ses cheveux* is possessive and um, *les cheveux* is just like the hair, it's like her hair. **But I think they, they imply the same thing.**	
	83. R1:	Um.	
	84. N:	*Et* uh, and um, because I wrote *se brosser les dents et les cheveux*, it's because I've l*es dents* there, for some reason. **But I don't think, I think it's because uh I wrote because *se brosser les dents* like if I wrote *ses dents* it wouldn't make much sense. I had to put *les* for *cheveux* too or something.**	
Stage 4 – Post-test		***les cheveux***	

In the CCE represented in Extract 2, Neil disagrees with the reformulation and questions the change because he thinks that the change in the reformulation and his own version "imply the same thing" (turn 82). However, it seems that challenging the reformulation prompts him to question a parallel structure in the texts (*les dents*/*ses dents*). In turn 84, he talks about these structures, and it seems that by manipulating the different linguistic forms, he realises that using the possessive pronoun *ses* "wouldn't make much sense". This CCE challenges Neil's 'theory' of the use of the article and the possessive pronoun in French and pushes him to discuss the differences, and, as he does so, linguistic awareness and language learning unfolds.

What happened with Neil is consistent with what Appel and Lantolf say about speaking as mediation: "[U]nderstanding textual material when it does happen, is not necessarily a covert process, but can be externalized as speech" (1994: 449). Furthermore, if "the amount of time spent explaining correlates highly with the amount learned" (Johnson and Johnson 1989: 57), it follows that having the opportunity to explain to others what one interprets, believes and/or thinks will enhance comprehension and learning. Moreover, Neil's conclusion that he "had to put *les* for *cheveux*" (turn 84) is evidence that, as Vygotsky states, "the thought is not expressed but completed in

Extract 3. Sam and Marnie's CCE *un coup de pied*

Dictogloss pair: Sam and Marnie, CCE lexical–noun			
Stage 1		Pre-test	Reformulation
		Avec son pied	***d'un coup de pied***
Stage 3 – Stimulated Recall	130. S:	Yeah. **But the only thing that is weird is like *un coup de pied* like she kicks it off.**	
	131. M:	Yeah, she like kicked it off the desk or whatever.	
	132. S:	'Cause it says *un coup de pied* and that means like	
	133. M:	**Kicks it like . . .**	
	134. S:	**And we thought that like she used her toes to press**	
	135. M:	**To press the button**	
	136. R1:	So you think *coup de pied* is more like	
	137. M:	**Yeah, like kicking**	
Stage 4 – Post-test		Sam	Marnie
		Avec ***un coup de pied***	*d'****un coup de pied***

the word" (Rieber and Carton 1987: 250) and that what happens in social interaction first is appropriated later, as he gets the item correct in the post-test.

In Extract 3, Sam and Marnie are not convinced by the change *un coup de pied*. They not only question the reformulation but also the action it represents. At the time of doing the dictogloss task and writing their original text, they (correctly) thought that the character in the story, Martine, had pressed the alarm clock button with her toe. This was their visual image of this part of the story. The reformulator, however, changed this image somewhat (and thus the action) by using the phrase *un coup de pied*. Questioning the reformulation and being given the chance to articulate their reaction to it allowed Sam and Marnie to take the reformulator's perspective and, in doing so, understand and even criticise their own interpretation of the story. Throughout turns 130 to 135, Sam and Marnie jointly compare and contrast the structure and action described in their original text (i.e. Martine pressed the alarm clock button with her toe) with the one of the reformulation (i.e. Martine kicked the alarm clock to turn it off). Even though they initially told the research assistant, whom they thought had made the change herself, that what she wrote was "weird" (turn 130), they seemed to have become aware of the differences as they talk, and they both reconsidered their original choice. They both had this item correct (i.e. matching the reformulation) in the post-test. (See Swain and Lapkin 2002 for a similar example with Nina and Dara).

This was not the only change Sam and Marnie questioned.

Extract 4. Sam and Marnie's CCE *se peigne*

Dictogloss pair: Sam and Marnie, CCE form–sentence structure		
Stage 1	Pre-test	Reformulation
	elle se peigne les cheveux	*(elle)* ***se peigne***
Stage 3 – Stimulated Recall	220. R1: Ok, so, for that one it was *se peigne les cheveux*.	
	221. M: Yes, that's what we had.	
	222. S: Yeah	
	223. R1: So, you said *c'est juste se peigne*. Why did you say that?	
	224. M: Because, why did I say that?	
	225. R1: Um-hum	
	226. M: **Because on yours, all you had on like your copy was just *se peigne*. That's all you had. But we had *se peigne les cheveux*. So I just said *c'est juste se peigne* instead of *les cheveux* but so like kind of**	
	227. S: **I think that it would be the same thing because**	
	228. M: **Yeah, like maybe I don't know, like she combs like the hairs on her arms [laughter]**	
	229. R1: That's interesting, Marnie	
	230. M: Like if she just combs her dog or something	
	231. S: Yeah, like	
	232. R1: Could it be she combs her dog if she	
	233. M: No, *se peigne* I guess. Like, so I guess-	
	234. S: You still	
	235. M: **it would be fine either way, I guess**	
	236. S: **Yeah.**	
Stage 4 – Post-test	Sam	Marnie
	elle ***se peigne***	*elle* ***se peigne***

In Extract 4, Sam states their disagreement with the reformulator by implying that the change made was unnecessary (turn 227).[6] Marnie agrees with Sam (turn 228). Not only do they say that what they had written was as good as what the reformulator had written, but they even make fun of the change made by expressing that Martine, the character in the story, was obviously combing her hair (as in the hair on her head and not on her arms or the dog's hair – turns 228 and 230). Even though they defend their original decision (turns 235–236), this CCE mediated their use of *se peigne* in the post-test.

In the CCE in Extract 5, both Nina and Dara initially agree with the reformulation (turns 159 and 160) by saying that the reformulated item (*commence à*) "sounds better". However, right after Dara agrees with the

Extract 5. Nina and Dara's CCE *commence à*

Jigsaw pair: Nina and Dara, CCE form–preposition			
Stage 1		Pre-test	Reformulation
		commence de	***commence à***
Stage 3 – Stimulated Recall	156. R1:	OK, so we have *de* instead of ***à***. xx	
	157. D:	Yeah. So you changed it to ***à***?	
	158. R1:	Yeah.	
	159. N:	**Well, yeah, that sounds better *"à la chatouiller avec une plume"*.**	
	160. D:	***"Un bras en sort et commence à la chatouiller".*** **Yeah, it does.**	
	161. N:	**Well, maybe not *"à la chatou-"*** [reading to herself] ***"Un bras en sort et commence à la chatouiller".***	
	162. D:	Did you put an accent on it?	
	163. N:	It sounds the same to me.	
	164. R1:	Whether it's *de* or whether it's ***à?***	
	165. D:	I don't think that makes much difference. It's kind of like with the *Quand elle ne se lève pas* and the *voyant qu' elle ne se lève pas*. It doesn't make much of a difference.	
	166. R1:	OK, so you see that as the same. OK.	
Stage 4 – Post-test		Nina	Dara
		commence à	*commence de*

change, Nina rethinks this decision and says the change may not be better. She then re-reads the text to herself and, in doing so, she seems to re-evaluate their original choice of preposition, as she uses the correct preposition in her post-test. Dara, on the other hand, 'sits on the fence' and says that both prepositional phrases are the same and "it doesn't make much of difference" which one is used (turn 165). Moreover, in turn 165, she even brings up a correction made previously for a couple of conjunctions (*quand* vs. *voyant que*). Unlike Nina, Dara chooses in the post-test to leave the preposition she had originally used.

As evidenced in this example, even when pairs participated in the same CCE, it did not necessarily mean that the same knowledge will be appropriated by both of them. That is, a pair may be involved in the same discussion, but there is more to what happens in the social domain than meets the eye (or ear!). The external action of discussing the correct use of the preposition seems to start 'moving inward' for Nina in turn 161 when she reads to herself the reformulator's version. As noted earlier, a cognitive

Extract 6. Nina and Dara's CCE *de la maison*

Jigsaw pair: Nina and Dara, CCE form–preposition+article			
Stage 1		Pre-test	Reformulation
		du maison	***de la maison***
Stage 3 – Stimulated Recall	213. R1:	Ok, so *de la maison* and *du maison*.	
	214. D:	**Uh, it could have been any way.**	
	215. N:	It has to do with *du*, *de la*. I remember when we were first writing it	
	216. D:	Yeah.	
	217. N:	and we went like "Is it either *du* or *de la*? And we agreed that it was *du* but I don't know [laughs]	
	218. D:	I don't think I can remember it exactly, but	
	219. N:	**Yeah, sometimes it's like xx *de la*? Isn't it *de la* equals *du*? I don't know**.	
	220. D:	**Nooo! Shoot, uh Ok**.	
	221. R1:	So you know there's a rule in there, but	
	222 D:	Um-hum, like I cannot remember things that I learned in grade five. They are a complete blur [laughter], so	
	223. R1:	Many things are blurry to me.	
	226. D:	***De la* does make more sense.**	
	227. N:	Well, I don't know. *De la* equals *du*	
	228. D:	Really?	
	229. N:	Yeah.	
Stage 4 – Post-test		Nina	Dara
		du maison	***de la maison***

conflict is effective when students acknowledge the difference (which Dara was not prepared to do) and are willing to make the change.

In Extract 6, Nina and Dara are challenged one more time by the reformulation. What they believe, what they argue for and what they appropriate is, once again, different even though they are both engaged in the same CCE.

Disagreement was not always with the expert feedback but also with peer feedback. In this excerpt Dara disagrees with Nina's rule that *du* equals *de la*. Nina reiterates this (incorrect) rule in turn 219 (though she also has doubts about it and says "I don't know" twice – turns 219 and 227). Throughout this CCE, that is, by challenging their own understanding or 'theory' of the use of *du*, Dara's learning unfolds. In turn 214 she tells the researcher that both their original choice and the reformulation are correct. Nina then reminds Dara of the discussion they had when writing their text and states again their original source of conflict: "Isn't it *de la* equals *du?*" (turn 219). It is precisely

then (turn 220) that Dara realises that Nina is stating the rule incorrectly, and by turn 226 she realises that "*de la* does make more sense". When Nina repeats the rule incorrectly in turn 227, Dara once again questions it and gets the item right in her post-test. Nina, on the other hand, has obviously appropriated a rule that is wrong. Even when this CCE has presented an opportunity for change, it seems she would need more explicit instruction and explanation to change what she has previously learned wrongly.

Findings for Question 3

In this section we will address the following question:

3) What insights do the students offer in their interviews about the CCEs prompted by the reformulation and the discussion it generated?

The findings for questions 1 and 2 have shown that by questioning the reformulated text, learning occurs. The students themselves seem to be aware of this phenomenon. In fact, the students say they need to discuss the expert feedback. When the research assistant asked Dara is she would rather have the reformulator next to her to discuss each item, she said:

> I would have preferred to have the person like sitting like next to us correcting it. . . . It's better to talk with the person 'cause they might not understand an idea or something and they might go and change it. . . . Yeah, 'cause then I, I think they would have understood it more. . . . Because then you are, you are just looking at it and you're like: Ok, they changed something. So that's why it's better to have the person like, talking to you about the corrections that they've made.

Kristy agrees with Dara: "Well, I think maybe I would have remembered it more if like say we have someone . . . like the person came here and like, talked to you." Clearly, even the students recognize that talking about and questioning the expert feedback helps students to remember things better.

Furthermore, if conflicting perspectives arise, they can enhance learning through the actual manipulation of different concepts, ideas and beliefs. As Vygotsky pointed out: "Great genius is formed with the help of another genius not so much by assimilation as through friction" (Vygostky 1999 [1933]: 273, note 62). The formulation of the argument can indeed play an important role in restructuring and/or acquiring new knowledge. And, as expressed by Nina, it can also aid memory:

> . . . we argued a bit about some of the things, that's why we remembered them. . . . I think that talking about them, like what we did. We talked about them, then we said like why? Why we thought it was that? So that

> [way] we kind of remember it since we had a kind of discussion on it, so we remembered it.

It has become evident that the students in our study are not willing to take the teacher's feedback at face value. In fact, they disagree with some of their current classroom practices and seem to know how they would learn better. In their own words:

> Sometimes the teachers, they explain things and sometimes not very clearly. And everybody else is like doing whatever they think the teacher said and I, I'm sitting there and I am like: "what does the teacher want?" And sometimes the teacher doesn't want to talk to us because they are correcting, they're doing something with the principal . . . And so I usually have to ask a friend if they know it, if they understand what they are supposed to do. (Monica, interview – turn 128)

> Normally we correct it as a whole class, but I don't think that works really well. Like I mean, you get your answers corrected but it doesn't get explained to you like when you make mistakes what is the right answer. (Nancy, interview – turn 82)

Students need to talk about what is being taught and why they are being corrected. When Nancy says that "it doesn't get explained to you like when you make mistakes . . . what is the right answer", she seems to be asking teachers to open the classroom for discussion in which answers are displayed and discussed. In sum, students seem to be requesting to engage in CCEs where they can be guided to see where and why they made a mistake and how to correct it satisfactorily.

Discussion and conclusion

We view the conflict and disagreement that students faced in the CCEs above as providing impetus for them to re-examine their language use and clarify their thoughts. More so than through agreeing, we believe that through the clashing of ideas, theories and beliefs "[one] diamond polishes another" (Rieber 1999: 121) and knowledge is co-constructed. Second language teachers might place too heavy an emphasis on reaching consensus and thus disregard the use of cognitive conflict and disagreement as a site for learning. Matusov (1996: 41) prompts us to seek situations in which we can build "on each other's ideas including a broad range of relations such as agreements, disagreements, elaborations and disjunctions. These relations constitute the process of meaning making and activity development."

Through the micro-analyses of the CCEs and the students' post-tests, we have seen that students can thrive on conflict and disagreement. That is, the

students in this study do not seem to be afraid of questioning the expert feedback if they do not understand the changes. In fact, they ask to have such an opportunity.

The reformulation of the students' own writing and, particularly, the discussion it generates appear to be good techniques which successfully prompt cognitive conflict in which different views, theories and beliefs are raised to a conscious level through talk. When the reformulation brings about a cognitive conflict, the student is given an opportunity to advance his or her understanding of the target language, and teachers and researchers are given opportunities to advance their understanding of the student's second language learning. The stimulated recall provides opportunities to reflect on and discuss the language point in question and allow for a deeper understanding of the proposed change (Swain and Lapkin 2002).

Questioning feedback and being given the chance to articulate their reaction to it and their own beliefs and theories allowed students to take the reformulator's perspective and, in doing so, understand and even criticise their own perspective. In other words, because there was a cognitive conflict, students were prompted to verbalise their thoughts and reasoning and question their own knowledge. In order to question the reformulation and disagree with it, students necessarily had to consider their own language use. That is, through explaining, questioning, disagreeing and sometimes defending their own view, students construct new knowledge. In sum, during the CCEs discussed in this article, students have transformed thought into words, generating talk that mediated learning as measured by the students' performance in their post-tests.

As noted by the students themselves, one strategy that teachers can use is to induce cognitive conflict by challenging the students' own understanding or 'theory' of their second language by offering alternative means of expression and guiding students through a discussion about them. However, not all students may react in the same way to the notion of conflict. Students' cultural backgrounds, goals, age and proficiency may affect the way they view conflict (see Ojima and Watanabe 2003; Hearnden, Marshall and Soheili-Mehr 2003) and thus their willingness to create and/or participate in a CCE. Students in our study were all Canadians in a Canadian setting. Elsewhere or in more diverse classrooms, the nature of cognitive conflict may be differently perceived and understood. Therefore, explaining such cultural differences to students is likely to heighten their awareness of how interaction can play out differently according to each other's backgrounds. Teachers can determine the right conditions to create opportunities for CCEs to arise and for students to take advantage of them. To this end, it is important that they and the students understand what a cognitive conflict is and how to distinguish it from other types of conflict, be it affective conflict or cultural differences. This is indeed a most challenging distinction to be made, for cognition and affect are interconnected. In other words, it is important for teachers and students to understand that, as

demonstrated in this study, within facilitative conditions, cognitive conflicts can prompt interesting and insightful discussions that will, in turn, create feelings of uncertainty and curiosity and "promote the students' transitions from one stage of cognitive reasoning to another" (Johnson and Johnson 1989: 62).

In conclusion, we believe that the notion of cognitive conflict is an important one with respect to learning. It deserves further investigation exploring its use and effects in other contexts as well as its relation with other types of conflict or cultural approaches to collaborative learning.

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Notes

1. The graduate student research assistants, however, were instructed to ask, not to answer, questions that arose in the process of data collection. This was often difficult to do considering the social nature of the data collection process.
2. The research team consisted of Merrill Swain, Sharon Lapkin, Agustina Tocalli-Beller, Lindsay Brooks, and Carole Bracco. The latter three, graduate students at OISE/UT, collected the data.
3. See Swain and Lapkin (2002) for details on this pair of students.
4. One of our reviewers noted that Nina and Dara had so many more CCEs in stage 3 than the other participants that it seemed only natural that they 'forgot' about the results of a couple of them at the post-test stage.
5. The reformulator had never seen or heard the original text on which the stimulus (presented on video) was based because we wanted her to work from the students' meaning and not from her memory of the meaning of the original text. At the time of the reformulation she used a different word than Jim and Anna had heard, thus leading to Jim's confusion.
6. Swain and Lapkin (2002) address the reasons why students thought some changes were unnecessary.

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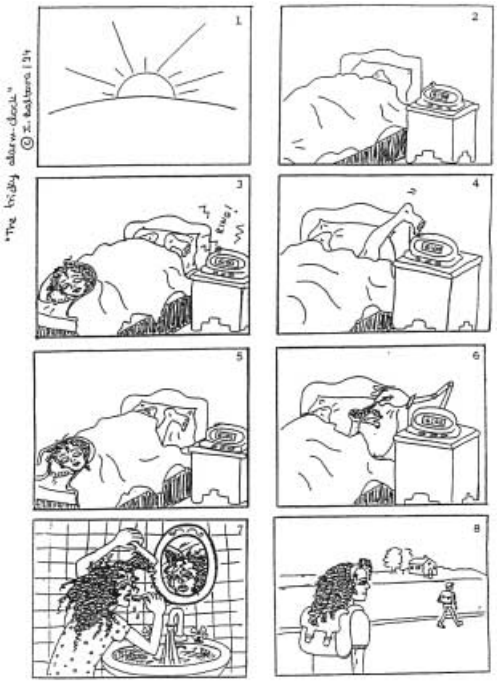
Appendix A

Jigsaw task – visual stimulus



Dictogloss text – audio stimulus

Le réveil-matin de Martine:
Il est six heures du matin et le soleil se lève. Martine dort tranquillement dans son lit. Elle fait de beaux rêves, la tête au pied du lit et les pieds sur l'oreiller. Quand le réveil sonne, Martine ne veut pas se lever. Elle sort son pied et avec le gros orteil, elle ferme le réveil. Elle se rendort tout de suite. Mais elle a le réveil qu'il faut pour ne pas être en retard. À six heures et deux minutes, une main mécanique tenant une petite plume sort du réveil et lui chatouille le pied. C'est efficace! Finalement Martine se lève. Elle se brosse les dents, se peigne les cheveux et s'habille pour prendre le chemin de l'école. Encore une journée bien commencée!

Translation: Martine's Alarm Clock
It's six a.m. and the sun is rising. Martine is sound asleep in her bed. She's having sweet dreams, her head at the foot of the bed and her feet on the pillow. When the alarm clock rings, Martine doesn't want to get up. She

sticks her foot out, and with her big toe, she shuts off the alarm. She falls asleep again immediately. But she has the kind of alarm clock you need to prevent being late. At 6:02, a mechanical hand holding a small feather comes out of the alarm clock. It tickles her foot. To good effect! Finally Martine gets up. She brushes her teeth, combs her hair and gets dressed to go to school. Another great start to the day!