Code-switching in relative clauses:
Some theoretical implications

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Abstract:

This work is part of an ongoing pilot project which analyses mixed German/Italian relative clauses that may be found in bilingual competence, in order to shed a different light on general theories regarding the derivation of relative clauses. Specifically, we will investigate German relative clauses, whose head is a mixed German/Italian DP: if we consider pairs of nouns which carry a different gender feature in the two languages in question, D may either agree in gender with the noun (*selected gender*) or agree with the equivalent noun in the other language (*analogical gender*). The relative pronoun, which is another D-head, may in turn agree, or not, with either the external D, or the N-head of the relative clause. An Acceptability Judgement Task including mixed relative clauses with all possible gender cross-combinations has been administered to some bilingual speakers (2L1), as well as to some highly competent L2 learners, in order to see which agreement types are preferred, and whether there are regular restrictions in acceptability. The data obtained have been confronted with current theories on relative clauses, in order to see if the predictions they would make are actually borne out.

Keywords: Code-Switching, Gender, Mixed DP, Relative Clauses

1. *Introduction*[*]

Starting from the Null Hypothesis on Code-Switching (NHCS), which assumes that "Code-switching and pure languages are governed by the same

set of constraints and principles in syntax, production and pragmatics" (Chan 2003: 17), the main aim of this work is to investigate mixed relative clauses, in order to individuate restrictions in acceptability, which may shed a different light on general theories regarding the derivation of relative clauses (RCs). Indeed, if NHCS is correct, any theory formulated for pure languages should be able to account for code-switching data as well.

Specifically, we will focus our attention on gender agreement in mixed Italian/German relative clauses. Italian and German are particularly suitable for our purpose, given that they both overtly spell-out gender agreement relations; moreover, German relative pronouns (RPs) agree in gender (and number) with the head of the RC:

(1)   Die   Frau,   die   Johann liebt
      the(f) woman(f) RP(f) Johann loves
      'the   woman   whom Johann loves.'

This paper will proceed as follows. In Section 2, we will briefly summarize some recent theories about mixed DPs in code-switching contexts; besides, we will discuss the concepts of selected gender and analogical gender. In Section 3, we will tackle the problem of gender agreement in mixed relative clauses, and give an outline of the Acceptability Judgement Task that we have administered to some adult participants. Section 4 contains a presentation and a discussion of the data we have collected thus far,[1] while in Section 5 we will outline the theoretical problems raised by these data with respect to current theories on the derivation of relative clauses. In particular, we will discuss the Head-raising analysis of RCs (Kayne 1994; Bianchi 1999 and related work), the so-called Matching hypothesis (Sauerland 1998), as well as an alternative analysis which assumes that the head of the RC is generated externally (e.g. Manzini and Savoia 2011).

2. *Mixed DPs in code-switching contexts*

Much work on code-switching (henceforth CS) has focused on mixed DPs, namely DPs where the determiner and the noun are spelled out in different languages (see the seminal paper of Poplack *et al.* 1982, and more recently Radford *et al.* 2007; Liceras *et al.* 2008, among others). Crucially, if the two languages in contact are both gendered languages, such as Italian and German, and a noun in one language has a different gender with respect

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[1] Indeed this is only a preliminary result, since more participants have recently been involved in the project, and a larger amount of data will soon be available, whose analysis is postponed to future work.

to the equivalent noun in the other language, mixing may give rise to four different outputs, exemplified in (2a-d):[2]

(2) a. il   Stuhl
         the(m) chair(m)

     b. la   Stuhl
         the(f) chair(m)

     c. die   sedia
         the(f) chair(f)

     d. der   sedia
         the(m) chair(f)

In (2a) the determiner receives the *selected gender*: the gender of the German noun (masculine) values the gender of the Italian determiner. In (2b) the determiner receives instead the *analogical gender*; here the Italian D° is not valued by N°, but by the so-called *equivalent noun*: the Italian word for *Stuhl* 'chair' is indeed feminine (*sedia*), hence the feminine determiner. Analogously, with the Italian feminine noun, the determiner may receive either the selected gender (2c), or the analogical gender (2d). All of the combinations in (2) are frequently found in CS productions of bilingual speakers.

In contrast with other approaches to CS,[3] the Borrowing Hypothesis (BH), proposed by Poplack and Meechan (1995), assumes that all instances of word insertion within a sentence in a different language should not be analysed as true CS, but rather as temporary borrowings, as far as the words are perfectly integrated under a morpho-syntactic point of view. Therefore, in these authors' opinion, this assumption should also apply to mixed DPs, such as (2b) and (2d) above.

The Bi-lexical Model, proposed by MacSwan (1999) and related work, more or less explicitly assumes BH and rephrases it in Minimalist terms, in line with NHCS. Within this approach, Cantone (2007) assumes that the switched noun determines the gender of the determiner; however, this prediction does not seem to be supported either by examples like (2b,d) above, or by widely attested productions, such as (Spanish/English or Italian/English)

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[2] We have excluded the mixed DP *das sedia*, given that neuter is not the gender of either nouns *Stuhl/sedia*. Later on in the paper we will however examine also cases of gender mismatch, such as the above-mentioned one.

[3] See in particular the Matrix Language Frame Model (Myers-Scotton 1993, and subsequent work), which assumes that, in CS contexts, all functional categories are provided by only one of the two languages in contact, which the author calls the Matrix Language. However, this approach will not be discussed in detail in the present work.

la house, where the language providing the switched noun is a genderless language, but the determiner does not carry the default gender (masculine).[4]

Since the so-called analogical gender, seen in (2b,d), seems to pose serious theoretical problems to most approaches to CS,[5] in a previous work on mixed DPs in CS contexts (Cocchi and Pierantozzi 2015) we investigated gender relations which are realized outside the DP domain, in order to test the ability of nominal gender to be "infinitely reusable as an *active goal* feature [in Carstens's (2010: 31) terms] in successive Agree relations".[6] In particular, we discussed German relative clauses and Italian ergative constructions (i.e., unaccusative, passive and reflexive verbs), where the *active goal* for Agree is either a monolingual or a mixed DP.[7]

The results we obtained in the cited work suggest that analogical gender cannot simply be analysed in terms of a temporary borrowing, contra BH, since Italian/German bilingual speakers may accept sentences where a monolingual DP expressed in the other language values a probe through the analogical gender. To make an example, in (3) below there is a noun which has a different gender in the two languages: neuter in German and feminine in Italian. The probe, i.e. the relative pronoun, does not agree in gender with the feminine RC-head (either D or N), but rather with the equivalent neuter N:[8]

(3)   Hai   chiuso la   finestra,   das   dein Bruder immer offen lässt?
       Have.you closed the(f) window(f)   RP(n) your brother always open leaves
       'Have you closed the window that your brother always leaves open?'
       [Italian N: finestra(f) - German equivalent N: Fenster(n)]

If analogical gender simply were a gender assignment rule at work in the Lexicon (as in Poplack *et al.* 1982; Corbett 1991) it should be confined to the noun and not be assigned to the whole DP, contrary to the facts. Moreover, if the goal of the operation Agree is a mixed DP, the original gender of

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[4] See Liceras *et al.* (2008), among others.

[5] Even an approach in line with Distributed Morphology (Halle and Maranz 1993), which seems able to account for analogical gender (see among others Liceras *et al.* 2008; Pierantozzi 2012) presents some serious problems, in that it over-generates unwanted derivations. However, this issue lies beyond the scope of the present work.

[6] In other words, Carstens assumes that nominal gender is a feature which may value more than one probe.

[7] In particular, in the cited work we tested German relative clauses, which modify either a mixed or a monolingual Italian DP, and Italian ergative clauses, whose past participle agrees with either a mixed or a monolingual German DP-subject. We will abstract away from the latter set of data in the present work.

[8] The sentence in (3) has been accepted by SA and G (cf. Section 3 below); a third bilingual speaker, SI, accepts a similar one (... la bambina, das...).

a noun, whose determiner receives the analogical gender, like (2b), should be completely de-activated. In short, BH predicts that, in CS sentences like (4) below, the probe (RP) should systematically agree with the determiner and not with the German selected noun. Hence, we would expect that a test sentence like (4), where the RP agrees instead with the German neuter N and not with the feminine D, should be deemed unacceptable:

(4)   Vorrei leggere   la   Märchen, das   Martin geschrieben hat
       I.would read   the(f) story(n) RP(n) Martin written   has
       'I would like to read the story that Martin has written.'
       [German N: Märchen(n) - Italian equivalent N: favola(f)]

Therefore, we now open the following research questions. On the one hand, we must check whether the relative pronoun systematically agrees in gender with the external D, or rather if the four cross-combinations, that we obtain whenever a noun in one language has an equivalent noun in the other language with a different gender feature, are all available (with possible restrictions) in a bilingual competence;[9] on the other, we have to discuss whether all of the acceptable mixed agreement patterns can be derivable under current approaches to RCs.

In the following sections we will first give a detailed outline of the questionnaire we have administered to our participants, and then examine the results we have obtained till now. Finally, we will discuss the problematic theoretical aspects which emerge from our data.

3. *German (mixed) relative clauses: AJT design*

In order to collect data on CS productions, which may help answer the above-mentioned research questions, an Acceptability Judgement Task (AJT) containing German relative clauses, whose head is either a mixed DP or a monolingual Italian DP, has been administered on-line (through Google Form) to some adult participants, described in Table 1:[10] four German/Italian 2L1 bilinguals [three from Switzerland (E, SA, SI) and one from Germany

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[9] Cf. MacSwan (1999) and subsequent work.

[10] The original AJT that we have used for our first survey was distributed into 8 Google Forms, each of which was composed of approx. 55-65 sentence: 70% test sentences and 30% distracters. The test sentences including German fragments had first been checked by a German monolingual speaker, and then manipulated for switching and mixed agreement. More recently, in order to collect new data from a young population of Standard German/Italian bilinguals of a bilingual school in Munich, we have reviewed the AJT, by introducing new test sentences and crucially reducing to a maximum of 25-30 the total amount of sentences of each single Google form. This data collection is still in progress and will be discussed in future work.

(M)] and two L2 learners: one having German as L1 and living in Italy for 22 years (C), and the other having Italian as L1 and living in Germany for 30 years (G).

Table 1. Participants

Participants	2L1	L2
Number	4	2
Age of Acquisition	0-3	8 or later
Age range	31-37	50-58
Average age	34	54

The AJT (3 scale with corrections)[11] contains sentences with all possible gender combinations, all featuring nouns which carry a different gender feature in German and Italian. It also includes monolingual sentences aiming to test gender agreement competence, and other mixed sentences which serve as distracters, including cases of mismatching agreement.[12]

Despite a certain degree of individual variation regarding the tolerance to CS, all the participants have shown a high competence in mixed agreement. In fact, they all accept the four mixed RCs displaying matching gender agreement and reject all those displaying mismatching agreement, providing coherent corrections.

We have also come to the conclusion that the switching point between the head noun and the relative operator is fully available, either in subject relative clauses (5-6) or in object relative clauses (7-8). Indeed, all of our participants accepted mixed sentences, where the matrix clause and the relative clause are spelled out in different languages.[13]

In (5-6) an Italian RC is inserted into a German sentence:

[11] Participants may judge sentences as acceptable, marginally acceptable, or unacceptable; in the latter case, they may indicate a possible correction, which, in their opinion, increases the degree of acceptability.

[12] Sentences containing matching and mismatching agreement all feature nouns which have the same gender in the two languages. They were included only to test the participants' competence on gender agreement, and the availability of the switching point between the head noun and the RC.

[13] In the following examples (5)-(8) the nouns involved have the same gender in the two languages.

(5) Die Erzählung, che   Maria ti   racconterà, ist fürchterlich
     the(f) story(f)   that(unmarked) Maria you will. tell is terrifying
     'the story that Maria will tell you is terrifying.'

(6) Ich habe den   Fisch gegessen, che   Gianni mi ha comprato ieri
     I   have the(m) fish(m) eaten,   that(unm.) Gianni me has bought   yesterday
     'I have eaten the fish, that Gianni bought me yesterday.'

In (7-8), instead, a German RC is inserted into an Italian sentence:

(7) Ho   sognato una capra, die   einen Hund stillte
     I.have dreamt.of a(f) goat(F) which(f) a   dog   suckled
     'I have dreamt of a goat that suckled a dog.'

(8) Ecco il   tavolo, den   Martin und Lisa uns schenken wollen
     Here's the(m) table(m) which(m) Martin and Lisa us give   want
     'Here's the table that Martin and Lisa want to give us.'

It is worth underlining that the switching point between the head of the RC and the relative operator is available either with object relative clauses or with subject relative clauses; see respectively the test sentences in (6) and (8) and those in (5) and (7). Given that object relative clauses and subject relative clauses are at the core of a well known asymmetry involving the processing system,[14] the total acceptability of sentences (5-8) by all participants allows us to exclude that any restrictions in mixed gender agreement patterns (which might emerge in clauses involving nouns with different genders in the two languages) may be brought back to performance or processing factors.

Crucially, the situation becomes much more complex, and participants' judgements less straightforward, when the head of the relative clause is a noun that carries a different gender feature in the two languages, as in the majority of the test sentences. Our participants have been asked to judge the acceptability of two types of mixed sentences: the head of the RC is, in the first case, a monolingual Italian DP, as in (3) seen above,[15] and, in the second case, a mixed DP, with all possible gender cross-combinations, as in (9-12) below, which all feature a German masculine noun, *der Sessel*, which has as an equivalent an Italian feminine noun, *la poltrona*.

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[14] Object relative clauses prove to be more difficult to process with respect to subject relative clauses. We will not speculate any further on this issue; for a detailed discussion see Friedmann, Belletti and Rizzi (2009), and the literature quoted therein.

[15] In this paper we will discuss in detail only RCs with a mixed DP as a head.

Let us now examine one by one each of the possible mixed agreement patterns. In (9), gender agreement is uniform throughout the sentence, since the two probes, i.e. the external D and the relative pronoun, which is also a D, agree in gender with the selected N; we call this type of relation *selected gender of the determiner* (SGD), because each D is valued by the selected gender of the noun:

(9) a. il   Sessel,   der   uns heute geliefert wurde   SGD
         the(m) armchair(m)   which(m) to-us today delivered was

     b. die   poltrona,   die   uns heute geliefert wurde
         the(f)   armchair(f) which(f) to-us today delivered was
         'the armchair which was delivered to us today.'

Like in (9), in (10) below the external D and the relative pronoun agree in gender, but the gender feature of the two probes is not valued by the selected N, but by the equivalent N in the other language; we call it *analogical gender of the determiner* (AGD), since each D is valued by the analogical gender of the noun:

(10) a. la   Sessel,   die   uns heute geliefert wurde   AGD
          the(f) armchair(m) which(f) to-us today delivered was

      b. der   poltrona,   der   uns heute geliefert wurde
          the(m) armchair(f)   which(m) to-us today delivered was

Thus, in (10), the original gender feature of N seems to be completely de-activated, and N is integrated into the morpho-syntactic structure of the other language. In short, in SGD and AGD mixed agreement types seen above there is no value mismatch among the probing heads.

We observe instead a gender mismatch in the two other possible combinations of mixed agreement, exemplified in (11-12). In (11a-b), the relative pronoun does not agree with the external D, but with the selected N. Notice that the external D receives the *analogical gender of the noun* (we call it AGN):

(11) a. la   Sessel,   der   uns heute geliefert wurde   AGN
          the(f)   armchair(m) which(m) to-us today delivered was

      b. der   poltrona,   die   uns heute geliefert wurde
          the(m) armchair(f)   which(f) to-us today delivered was

In this type of mixed agreement, the N-gender feature seems to be still active, as it values the RP. Notice that in the AGN type in (11), as well as in the AGD and SGD types in (9-10), the gender value of the RP agrees with a gender feature present in the head, either on D or on N.

In the last type of mixed agreement, given in (12a-b), the RP agrees with the equivalent N. But, in contrast to (11), the analogical gender of the noun does not show up on the external D. In fact, the head of the RC is a mixed DP, whose D receives the *selected gender of the noun* (we call it SGN):

(12) a. il   Sessel,   die   uns   heute geliefert wurde   SGN
          the(m) armchair(m) which(f) to-us today delivered was

      b. die   poltrona,   der   uns   heute geliefert wurde
          the(f) armchair(f) which(m) to-us today delivered was

In this type of mixed agreement, the gender value exhibited by the relative pronoun is not spelled-out either on D or on N.

Table 2. contains an overview of the types of mixed relative clauses contained in the AJT:

Table 2. Test Sentences overview with N-gender distribution

Gender of the N-pair	m/f	f/m	n/f	n/m	TOT
SGD	2	2	2	1	7
AGD	2	2	2	2	8
AGN	2	2	2	2	8
SGN	2	2	2	1	7
TOT	16	16	8	6	46

In the following section we will see how the participants to our survey have reacted towards mixed clauses like those in (9-12), obviously with different choices of nouns, and we will attempt to find a principled explanation to the restrictions in acceptability that may emerge.

4. *Results: participants' judgements*

In this section we are going to discuss the data we have obtained thus far and see which mixed agreement types are part of the bilingual competence. We have distinguished two different situations: in the first the two probes (external D and RP) agree in gender, while in the second there is a gender mismatching between them.

4.1 *Matching gender between the external D and the relative pronoun: the SGD and AGD types*

As might be expected, not all of the predicted patterns have equally been accepted by our participants. Sentences like (13), displaying the SGD pattern (cf. (9) above), are easily accepted by both 2L1 bilinguals and L2 learners.

(13) Ecco   la   Trommel, die   Gianni online bestellt hat   SGD
      here.is the(f) drum(f)   which(f) Gianni on-line ordered has
      'here is the drum which Gianni has ordered on-line.'
      [German N: Trommel(f) - Italian equivalent N: tamburo(m)]

The positive judgements of our participants do not change if the head
of the RC is an Italian N, be it masculine, as in (14), or feminine, as in (15):

(14) Ecco   der   coniglio, der   keine Karotten mehr isst.
      here.is the(m) rabbit(m) who(m) no   carrots   more eats
      'here is the rabbit who eats no more carrots.'
      [Italian N: coniglio(m) - German N: Kaninchen(n)]

(15) Die   gonna, die   Maria heute anzieht, è verde.
      the(f) skirt(f), that(f) Maria today wears,   is green
      'the skirt, which Maria is wearing today, is green.'
      [Italian equivalent N: gonna(f) - German N: Rock(m)]

With the exception of one 2L1 bilingual (SA), who systematically judges
sentences like (14-15) as slightly degraded and prefers to change the language
of the external D, as in (16), three out of four test sentences with SGD (with
an Italian N) agreement type have been accepted by all of our participants; only
one sentence has been rejected by a 2L1 (M), specifically the sentence in (17).[16]

(16) La   gonna,   die   Maria heute anzieht, è verde.
      the(f) skirt(m),   that(f) Maria today wears,   is green

(17) *Ho   buttato den   topo, den   der Hund versteckt hatte
       I. have thrown the(m) rat(m), which(m) the dog   hidden   had
      'I threw the rat, which the dog had hidden.'
      [Italian N: topo(m) - German N: Maus(f)]

If the gender of the German N is neuter, as in (18), the SGD agreement
type is not available, as Italian does not have neuter. Therefore, we tried to test
a sentence where the probe (the Italian D) receives the Italian default value,
masculine (NB: in (18) masculine is the gender of neither the German N
nor its Italian equivalent). Interestingly, all the participants reject (18), even
if the two D's agree in gender. In (19) we report the correction they provide:

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[16] The rejection of (17) cannot be attributed to the presence of accusative Case, since
we observed no discrepancies in acceptability of subject and object relative clauses.

(18) *Il   Licht,   der   im   Himmel blitzt, è solo un aereo.
     the(m) light(n) that(m) in.the sky   shines is only an airplane
     'the light that shines in the sky is only an airplane.'
      [German N: Licht(n) - Italian equivalent N: luce(f)]

(19) Il   Licht,   das   im Himmel blitzt, è solo un aereo.
     the(m) light(n) that(n) in.the sky   shines is only an airplane

In (19) the gender of the relative pronoun has been changed from masculine to neuter. The correction is not surprising, given that the German relative pronoun spells-out the neuter value of the selected N.

A similar type of correction has been provided by 2L1 speakers for (20), displaying AGD mixed agreement with a selected German neuter N; see how, in (21), the participants have changed the gender of the external D, choosing the default value:[17]

(20) ?/*Ecco la   Fleisch, die   meine Schwester mitgebracht hat.
        here.is the(f) meat(n) which(f) my   sister   brought   has
        'here is the meat which my sister has brought.'
        [German N; Fleisch(n) - Italian N: carne(f)]

(21) Ecco il   Fleisch, das   meine Schwester mitgebracht hat.
     here.is the(m) meat(n) which(n) my   sister   brought   has

Judgements concerning the AGD type, involving German masculine and feminine Ns, present a certain degree of individual variation. The Italian L2 learner accepts (22), while only one 2L1 (E) accepts (23):

(22) Il   Fledermaus, der   einen bunten Hut trägt, si chiama Dingo. AGD
     the(m) bat(f),   which(m) a   coloured hat wears, is called Dingo
     'the bat, which is wearing a coloured hat, is called Dingo.'
     [German N: Fledermaus(f) - Italian equivalent N: pipistrello(m)]

(23) La Rock,   die   Maria heute anzieht, era di tua madre.
     the(f) skirt(m), that(f) Maria today wears,   was of your mother
     'the skirt, which Maria is wearing today, was your mother's.'
     [German N: Rock(M) - Italian equivalent N: gonna(F)]

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[17] Indeed masculine is considered to be the default gender value in Italian, which lacks neuter. Moreover, almost all Latin neuter nouns have become masculine in Italian.
    Notice that however, in (20), unlike (18), the RP agrees with the equivalent N (f). For L2 learners and some 2L1 too, this agreement type, i.e. AGD, is sometimes acceptable, as we will see in short.

The AGD agreement type with an Italian N as the head of the RC is accepted by L2 learners, but it is judged as degraded (though not completely ungrammatical) by most of the 2L1 bilinguals:

(24) a. ?Voglio leggere die   racconto, die   von unserem   Abenteuer erzählt.
          I. want to.read the(f) story(m) which(f) about our   adventure tells
          'I want to read the story that talks about our adventure.'
          [Italian N: racconto(m) - German equivalent N: Erzhälung(f)]

    b. ?Voglio mettere das   camicia, das   Martin anprobieren möchte.
          I.want to.put.on the(n) shirt(f) which(n) Martin try   wanted
          'I want to put on the shirt that Martin wanted to try.'
          [Italian N: camicia(m) - German equivalent N: Hemd(n)]

The corrections of sentences like (24) feature again either the language switch of the external D, which turns the mixed DP into a monolingual DP, as in (25a) or the change of the agreement pattern into SGD, as in (25b):

(25) a. La matita,   den   Anne gestern   verloren hat, era un regalo.
          the(f) pencil(f), which(m) Anne yesterday lost   has, was a gift
          'the pencil, which Anne lost yesterday, was a gift.'
          [Italian N: matita(f) - German equivalent N: Bleistift(m)]

    b. Die   matita, die   Anne gestern   verloren hat, era un regalo.
          the(f) pencil(f), which(f) Anne yesterday lost   has, was a gift

It seems then that SGD (i.e. agreement of the two D's with the selected N) is the agreement pattern which is definitely preferred by 2L1 bilinguals, while there is not a single strong preference for L2 learners, given that they accept either the SGD or the AGD mixed agreement types.

4.2 *Gender mismatching between the external D and the relative pronoun: the AGN and SGN types*

In the AGN and SGN types, the external D and the relative pronoun do not agree in gender. In (26a) we report one of the four AGN test sentences (with a German N); here the external D overtly realizes the gender value of the Italian equivalent N, but the relative pronoun agrees with the selected German masculine N *Schmetterling*. Also in (26b), the relative pronoun agrees with the selected feminine German N *Blume*.

(26) a. ?*Ho   catturato una Schmetterling, der   nicht fliegen kann   AGN
          I.have caught   a(f) butterfly(m)   which(m) not   fly   can
          'I have caught a butterfly which cannot fly.'
          [German N: Schmetterling (m) - Italian equivalent N: farfalla(f)]

      b. ?*Credo che sia per te il   Blume, die   vor   der Tür abgelegt wurde
          I.think that it.is for you the(m) flower(f) that(f) in.front.of the door left was
          'I think that the flower, which was left in front of the door, is for you.'
          [German N: Blume(f) - Italian equivalent N: fiore(m)]

Only the Italian L2 learner accepts this type of agreement, independently of the gender of the noun, while the 2L1 reject the AGN with feminine and masculine N. Again, the possible corrections of (26), given in (27), turn to SGD agreement:

(27) a. Ho   catturato uno Schmetterling, der   nicht fliegen kann
          I.have caught   a(m) butterfly(m)   which(m) not   fly   can

      b. Credo che sia per te la   Blume, die   vor   der Tür abgelegt wurde
          I.think that it.is for you the(f) flower(f) that(f) in.front.of the door left was

Interestingly, the 2L1 bilinguals may accept the AGN type, but only with a German neuter N:

(28) Vorrei leggere la   Märchen, das   Martin geschrieben hat.
      I. would read   the(f) story(n), that(n) Martin written   has
      'I would like to read the story that Martin wrote.'
      [German N: Märchen(n) - Italian equivalent N: favola(f)]

The AGN pattern, having an Italian N as a head, has been accepted by some of the participants; one 2L1 accepts the sentence in (29a), while the Italian L2 learner accepts (29b).

(29) a. Guarda! Ecco das   castello, den   niemand kaufen will.
          look   here.is the(n) castle(m), that(m) nobody   buy   wants
          'look! Here is the castle that nobody wants to buy.'
          [Italian N: castello(m) - German equivalent N: Schloss(n)]

      b. Der   scimmia, die   gerade eine Banane isst, si chiama Giò.
          The(m) monkey(f), who(f) just   a   banana eats is called Giò
          'The monkey who is just eating a banana is called Giò.'
          [Italian N: scimmia(f) - German equivalent N: Affe(m)]

Two out of the four test sentences displaying AGN (with an Italian N) mixed agreement type have instead been rejected by all of our participants:

(30)   a. *Da dove arriva das   acqua,   die   auf dem Boden ist?
            from where comes the(n) water(f), which(f) on the   floor is?
            'Where does the water that is on the floor comes from?'
            [Italian N: acqua(f) - German equivalent N: Wasser(n)]

       b. *Ecco die muro,   den   dein Freund gemalt hat
           Here.is the(f) wall(m), which(m) your friend painted has
           'Here is the wall that your friend has painted.'
           [Italian N: muro(m) - German equivalent N: Mauer(f)]

In contrast to the SGD pattern, which is overall accepted, and the AGD and AGN types, which are marginally accepted, with more or less restrictions, the SGN pattern is judged severely degraded or definitely ungrammatical by almost all the participants, either with a German N (31) or with an Italian N (32).[18]

(31) *No, butta   solo die verdura,   das Lucia im Kühlschrank vergessen hat SGN
        no, throw.away only the(f) vegetables(f.sg), which(n) Lucia in.the fridge forgotten has
        'no, throw away only the vegetables that Lucia has forgotten in the fridge.'
        [Italian N: verdura(f) - German equivalent N: Gemüse(n)]

(32) *Ecco il   Haus,   die   Johann letztes Jahr gekauft hat
        Here.is the(m) house(n), which(f) Johann last   year bought has
        'here is the house that John bought last year.'
        [German N: Haus(n) - Italian equivalent N: casa(f)]

Interestingly, the L2 learner (Italian L1; G), provided the following correction:

(33) Ecco l'Haus,   die   Johann letztes Jahr gekauft hat
       Here.is the(unm.) house(n), which(f) Johann last   year bought has

The correction in (33) signals, on the one hand, that the noun *Haus* has been perfectly integrated into Italian from a morpho-phonological point of view (the *l'* form of the article indeed implies that the initial *h* is not pronounced, as in all integrated loanwords, e.g. *l'hotel*), and, on the other, the article *l'* is unmarked for gender, as it is used with both masculine and feminine

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[18] Only one 2L1 bilingual accepts one out of the eight SGN test sentences.

nouns with an initial vowel; thus we can say that the RP *die* agrees with the external D, and (33) is not SGN anymore, but AGD.

4.3 *Summary*

Table 3. below shows how all test sentences, divided into the four mixed agreement types, have been judged by our participants: acceptable (A), marginally acceptable (?), or unacceptable (*), as well as the percentages of acceptance with respect to the total number of test sentences of the same type:

Table 3: Participants' judgements

	SGD			AGD		
	A	?	*	A	?	*
L2 G. (G)	86% (6/7)	14% (1/7)	0% (0/7)	50% (4/8)	38% (3/8)	13% (1/8)
L2 It.(C)	86% (6/7)	14% (1/7)	0% (0/7)	75% (6/8)	25% (2/8)	0% (0/8)
2L1 (E)	14% (1/7)	86% (6/1)	0% (0/7)	0% (0/8)	63% (5/8)	38% (3/8)
2L1 (M)	71% (5/7)	29% (2/7)	0% (0/7)	13% (1/8)	38% (3/8)	50% (4/8)
2L1 (SA)	43% (3/7)	43% (3/7)	14% (1/7)	0% (0/8)	100% (8/8)	0% (0/8)
2L1 (SI)	29% (2/7)	0% (0/7)	71% (5/7)	0% (0/8)	0% (0/8)	100% (8/8)

	SGN			AGN		
	A	?	*	A	?	*
L2 G. (G)	14% (1/7)	0% (0/7)	86% (6/7)	25% (2/8)	0% (0/8)	75% (6/8)
L2 It. (C)	0% (0/7)	100% (7/7)	0% (0/7)	63% (5/8)	13% (1/8)	25% (2/8)
2L1 (E)	0% (0/7)	0% (0/7)	100% (7/7)	13% (1/8)	13% (1/8)	75% (6/8)
2L1 (M)	0% (0/7)	100% (7/7)	0% (0/7)	25% (2/8)	63% (5/8)	13% (1/8)
2L1 (SA)	14% (1/7)	71% (5/7)	14% (1/7)	25% (2/8)	75% (6/8)	0% (0/8)
2L1 (SI)	0% (0/7)	0% (0/7)	100% (7/7)	25% (2/8)	25% (2/8)	50% (4/8)

In Figure 1 we report instead the rates of acceptance (A) of the four mixed agreement types we recorded in the data.[19]

[19] In Figure 1 we put together the data of mixed RCs having as head both a German N and an Italian N. It is worthwhile underlining that the external factors, such as language dominance, as well as competence in agreement in monolingual speech, may influence the availability of the mixed patterns in a bilingual competence. However, the evaluation of the role played by external factors goes beyond the aim of this paper.

Figure 1. Rates of acceptance of mixed agreement patterns in mixed RC clauses
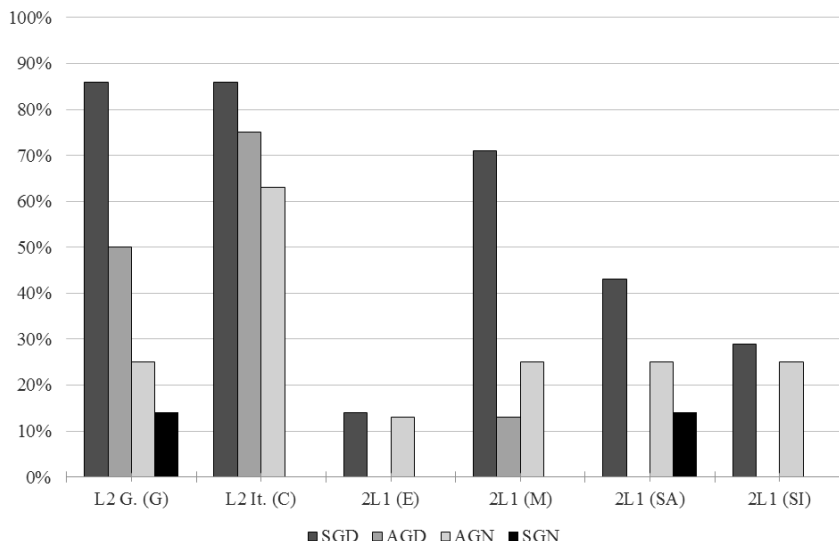
As may be observed, for some types of agreement there is a clear difference between L2 learners and 2L1 bilinguals. The AGD and AGN patterns are accepted mainly by L2 learners, while the 2L1 bilinguals clearly prefer SGD. Interestingly enough, for the SGN pattern there is hardly any difference in the judgements provided by L2 learners and 2L1 bilinguals: both groups almost always reject it, with very few exceptions.

These data, thus, prove problematic for both BH and the Bi-lexical model, in that these approaches would not explain how the original gender of a noun which receives a new gender in the Lexicon - i.e. the gender of the equivalent noun (see Poplack *et al.* 1982 and Corbett 1991, as well as MacSwan 1999) - may still be used as probe by the operation Agree, as seen e.g. in the AGN mixed agreement pattern.[20]

5. *Theoretical implications on relative clauses*

In this section we are going to discuss whether current theories on RCs are able to account for the data we have obtained on code-switching productions, and in particular for the fact that some mixed agreement patterns are clearly preferred with respect to others.

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[20] Even the Matrix Frame Language model, which we only hinted at above, cannot explain most of these data, specifically those where the external D is Italian, as, in this framework, all functional categories should be provided by the same language.

The focal point of the discussion regards the structural position where the head of the RC is base-generated (inside or outside the RC). As we will see, this issue proves fundamental for the possibility to derive the documented restrictions in acceptability.

5.1 *Head Raising Analysis*

As is widely known, the Head Raising analysis of RCs (Kayne 1994; Bianchi 1999 and related work), stemmed as an alternative to the traditional analysis, which assumed that RCs were right-adjoined to the NP they modified.[21] Crucially, in Kayne's (1994) innovative proposal, based on the Antisymmetry of syntax and the Linear Correspondence Axiom, adjunction in general, and right-adjunction in particular, is eliminated from the theory. As a consequence, a different analysis of RCs was advanced, which could also overcome what Bianchi (2002: 197) defines the *connectivity problem*, i.e. the fact that the relative head seems to play a double role in the structure, being interpreted as a constituent of both the matrix clause and the RC (see also Donati and Cecchetto 2011).[22]

In particular, the Head raising analysis assumes that the RC represents the complement of a determiner, and the NP-head (the one modified by the RC) is generated within the RC, rather than being external to it. Such an NP, then, moves from its thematic position to Spec(CP), thus ending up in a position which is adjacent to the external determiner, as in the following Italian example, as well as in its English counterpart:

(34) a. il libro che ho   comprato
         the book that I.have bought

   b. [DP il [CP che [IP ho comprato [NP libro
      [DP il [CP [NP libro] che [IP ho comprato [NP ~~libro~~

If the relative pronoun is overt, as in the English RC *the book which I have bought*, the derivation proceeds similarly, with the sole difference that the (internal, in this case) argument is a DP rather than an NP, whose D° is represented by *which*. The determiner status of the relative pronoun is even more evident in German, where the latter is homophonous to the definite article. See the derivation of a German RC in (35), in line with Kayne's (1994) and Bianchi's (1999) assumptions:

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[21] See in particular Chomsky (1965, 1977) and Jackendoff (1977).

[22] The Head raising analysis also presents empirical advantages (which will not be discussed here) with respect to the traditional adjunction analysis: indeed, in the cases of, e.g., idiom relativization and anaphor binding, the head behaves as a constituent of the RC; see Vergnaud (1985).

(35)   a.   das Buch   das   ich   kaufte
             the   book   the-RP   I   bought
             'the book which I bought.'

        b. [DP das [CP   ø   [IP   ich   kaufte   [DP das Buch
           [DP   das   [CP   [DP das Buch   ø [IP ich kaufte   [DP ~~das Buch~~
           [DP   das   [CP [DP [NP Buch] das [NP ~~Buch~~] ø [IP ich kaufte   [DP ~~das Buch~~

Thus, besides object movement to Spec(CP), as was in (34b), in (35b) we observe a further movement of NP to Spec(DP), as in the English *which*-RC discussed by Kayne. The head of the RC, *Buch*, thus follows the external determiner and precedes the so-called relative pronoun, which is another determiner which agrees in features with the former.[23]

The approach to RCs that we have just outlined has enjoyed a great success and has been widely adopted in virtue of the many theoretical and empirical advantages it brings about. Nevertheless, it has also been criticized. The main critical aspects that have been pointed out (see e.g. Borsley 1997) concern, on the one side, the fact that the head does not form a constituent with the determiner that precedes it - which, by the way, selects a CP rather than an NP - and, on the other, the difficulty to determine what triggers the movements assumed in derivations like (35) above, and in particular NP movement to Spec(DP).[24]

On the empirical side, the data on mixed RCs that we have outlined in 3. and 4. above do not seem to support a raising analysis of RCs. Indeed, under this theory, all of the mixed patterns seen in (9-12) could in principle be generated, without any preference for one type with respect to another. In fact, the agreement relation between the external D, the N-head and the D-relative pronoun represents the final output of a double application of the operation Agree: the first taking place within the RC, and the second involving the external determiner.

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[23] The external determiner and the relative pronoun always agree in gender and number, though they may not agree in Case, as shown in (i), where the (masculine) head of the RC represents the subject of the matrix clause, and the object of the RC:

   (i)   Der   Wein, den   ich kaufte,   ist sehr teuer
             The-NOM wine, which-ACC I   bought, is   very expensive
             'the wine which I bought is very expensive.'

This fact may be problematic and require extra-stipulations, for a Head raising analysis, especially if we consider languages where not only the determiner, but also the noun, is inflected for Case (cf. Borsley 1997). Even in German there are a few masculine nouns (e.g. *der Herr* 'the gentleman') which carry an accusative morpheme (*den Herrn*).

[24] In this regard, Kayne (1994) assumes that the head raises in order to reach a position which is governed by the external D°. However, this case does not strictly fall within the traditional GB concept of government, which, in addition, has practically been abandoned since Chomsky (1995). Recently, Donati and Cecchetto (2011, and related work), and also Gallego (2007), offer principled explanations which help overcome most of the mentioned theoretical problems that had been pointed out.

Let us suppose, for instance, that an Italian/German bilingual speaker selects the external D and the whole RC from the German lexicon, and the N-head of the RC from the Italian lexicon, as in (36). In this sentence the head of the RC is generated as the internal argument of the verb:

(36) Der/die matita, den/die Anne gestern verloren hat, era blu e verde
the(m/f) pencil(f) which(m/f) Anne yesterday lost has was blue and green
'the pencil, which Anne lost yesterday, was blue and green.'
[Italian N: matita(f) - German equivalent N: Bleistift(m)]

The first application of the operation Agree, which takes place in the object position of the RC, might value the gender feature of the D/RP according to either the gender of the selected N (feminine), as in (37), or the analogical gender (masculine), namely the gender of the equivalent N, as in (38):

(37) D [CP [DP die matita] [IP Anne gestern verloren hat [DP ~~die matita~~

(38) D [CP [DP den matita] [IP Anne gestern verloren hat [DP ~~den matita~~

Outside the CP, the second Agree operation involves the external D and the NP, which has moved to the root of the RC, according to the derivation in (35b) above. Again, in order to value the gender feature of the external determiner, it is possible to choose either the gender of the selected N or the gender of its equivalent N, as in (39) [from (37)], or in (40) [from (38)]:

(39) a. die [CP [NP matita] [DP die ~~matita~~] C [TP Anne gestern verloren hat [DP ~~die matita~~

b. der [CP [NP matita] [DP die ~~matita~~] C [TP Anne gestern verloren hat [DP ~~die matita~~

(40) a. die [CP [NP matita] [DP den ~~matita~~] C [TP Anne gestern verloren hat [DP ~~den matita~~

b. der [CP [NP matita] [DP den ~~matita~~] C [TP Anne gestern verloren hat [DP ~~den matita~~

Consequently, the four possible gender combinations can all be derived under this approach. This result is not in line with the data we have obtained, which show a strong discrepancy in the acceptability of these mixed sentences. Indeed, our data clearly show that the SGD pattern is overall accepted, AGD and AGN are accepted with restrictions (mainly by L2 learners, or when a neuter German N is involved), while SGN is practically always rejected, with very few exceptions, which can be classified as accidental.

5.2 *Matching analysis*

Under this approach (Sauerland 1998; Hulsey and Sauerland 2006), which is a revisited version of the traditional adjunction analysis (Chomsky

1965 and following work), the connectivity problem (i.e. the fact that an NP can be interpreted as a constituent of both the matrix clause and the RC), is solved by assuming that two identical NPs enter the derivation, one in each clause. Later on, the NP generated inside the RC gets deleted under identity with the external NP.

Once we apply these assumptions to CS data, some non-trivial questions arise. To start with, can we consider an N-pair (selected N/equivalent N, such as *Bleistift/matita*, 'pencil') to be 'identical' enough for the lower-generated one to be deleted? Furthermore, should grammatical gender interfere, and block deletion?

In this regard, Merchant (2014: 1) assumes the following *Gender and ellipsis generalization*: "when gender is variable (as on determiners, clitics, adjectives, and some nominals under certain conditions), it may be ignored under ellipsis. When gender is invariant (on nouns in argument positions, and on some nominals in predicative uses), it may not be ignored under ellipsis". Another version of the generalization, that Merchant (2014: 3) exposes but calls *Incorrect*, recites "Gender and number are irrelevant to ellipsis". The choice between the two versions depends on some still debated points on gender feature, which we will not develop any further here, regarding the functional head where such a feature is contained (i.e. GenP, nP or NP), and the distinction between semantic gender and syntactic gender.

If we assume, in line with Carstens (2010: 32), that syntactic nominal gender is an "uF: valued feature" on N, it does not give any semantic contribution, hence it is irrelevant and two nouns with different gender could enter the derivation. Therefore, if gender feature is irrelevant, either the Italian N or its German equivalent (whatever gender they carry) might enter the derivation and be deleted later on; thus we would derive all of the four agreement patterns, as in the Head-raising analysis, given that two Agree operations take place (one within the RC and one in the matrix clause). Again, this is contradicted by our data.

If we assume instead, in line with Merchant's "correct" version, that gender feature cannot be ignored - as the noun in question is indeed in argument position - only one N may enter the derivation (in other words, the equivalent N carries a different gender feature, thus it is not identical and cannot be deleted). This version, therefore, contradicts the basic assumption of the Matching analysis (i.e. two identical nouns that enter the derivation) and makes the same predictions as the Head-external analysis, which will be discussed in the following subsection.

5.3 *Head-external analysis*

In the previous subsections we have seen that an analysis which implies two different applications of Agree does not seem to point in the right direction to explain the data under discussion. Hence, an alternative view would

involve a single Agree operation, and this in turn entails that the head of the RC is generated CP-externally, as in more traditional analyses. However, in order to comply with Kayne's (1994) very founded objections against right-adjunction, we will posit that the RC is instead generated as the complement of N°, as also suggested by Platzack (2000).

At this point, we have to describe how the derivation proceeds, and more alternative views are possible. In traditional terms, we could assume that the RP is a variable, generated in a thematic position within VP, which later on moves to Spec(CP), as in Chomsky (1981) and Rizzi's (1996) Wh-criterion. Alternatively, in line with Manzini and Savoia's (2011) recent assumptions on sentence structure, we could posit that the RP is a D°-head, which does not raise from a thematic, VP-internal position, but is rather generated where it surfaces, i.e. at the root of the RC.[25]

Given that, in this case, there is only one N (the external one), hence only one application of Agree, not all of the four combinations may be derived. In fact, the relative pronoun, which we assume to enter the derivation valued for Case but unvalued for gender, has two different ways to value the gender feature, each of which makes different predictions about the mixed agreement patterns which may be derived.

Crucially the relative operator, which is generated at the edge of CP, namely at the edge of a phase, is in a position which is visible from the matrix clause generated above (Chomsky 2001 and following work), and in particular from the DP-head of the RC. Hence, in order to value its gender feature, the RP may use as a goal either the N-head, or the external D.

In the first case (RP valued by N) we would derive SGD and AGN patterns, while AGD and SGN are excluded. Suppose in fact that the head of the RC is the Italian feminine noun *matita*, 'pencil'. The RP agrees with it and receives feminine gender, regardless of the gender exhibited by the external D. The latter may in fact either receive the selected gender (f), as in (41a), or the analogical gender (m), as in (41b), since the German equivalent is a masculine noun, *Bleistift*. The possible combinations are thus:

(41)   a. Die matita [CP die ... (SGD)
      b. Der matita [CP die ... (AGN)

If the RP is instead valued by the external D, we may derive SGD and AGD patterns, but not AGN and SGN. Considering the same nouns, the RP

[25] See also Manzini and Savoia's work (e.g. 2004; 2005; 2011) on Romance clitics, which are also D°-heads, that are assumed by these authors to be generated in the preverbal position where they surface, rather than raising from a VP-internal position, in line with Sportiche's (1996) previous suggestions.

can receive either the selected gender (42a), or the analogical gender (42b), in line with the choice made by the external D. Thus we may derive:

(42)   a. Die matita [CP die ... (SGD)
          b. Der matita [CP der … (AGD)

In this way we can account for the fact that SGD is the preferred mixed agreement pattern: it is derivable in any case, regardless of the fact that the RP-probe chooses as a goal the N-head (41a), or the D-head (42a), to agree with.

AGN (41b) and AGD (42b) types can be derived via Agree with either N or D respectively; this may explain the fact that these patterns are considered only marginally acceptable, with restrictions. The latter may involve the age of acquisition - these patterns are overall accepted by L2 learners, but often refused by 2L1 bilinguals - and the gender involved - these agreement types are deemed more acceptable, even by 2L1, with German neuter nouns; this would suggest that neuter can be considered as the default Case for this language (Hickey 1999: 9-10).

Finally, this approach can explain why the SGN pattern, exemplified in (43) below, is overall deemed unacceptable: in this case the RP does not agree either with the external D, or with the selected N, but only with its equivalent:

(43)   * Die matita [CP der ... (SGN)

This pattern is therefore refused by all participants, who regard it as a true case of feature mismatching, and the very few cases of acceptance can be deemed as purely accidental.

6. *Conclusions*

The results we have obtained till now through the AJT point to some very interesting conclusions.

To start with, the predictions made by the theories on CS, discussed in Section 2, are not always borne out. Indeed, if a mixed DP represented an instance of N°-borrowing, as BH would assume, the analogical gender of N°, namely the gender of the equivalent N°, should be completely de-activated, and could not implement an Agree relation with material external to the DP projection, such as the relative pronoun, contrary to facts [cf. (22-23) above]. Likewise, if the switched noun determined the gender of the determiner, as assumed by Cantone (2007) within the Bi-lexical Model, participants should never accept either AGD or AGN agreement types, again contrary to facts.

As concerns instead the theoretical implications raised by our data with respect to current approaches to relative clauses, discussed in Section 5, the

restrictions we have observed in mixed gender agreement in RCs do not seem to be adequately captured by a Head Raising analysis, or a Matching analysis, as these theories would equally derive all of the possible gender combinations.

Our data favour instead a different approach, where the N-head is assumed to be generated externally to the RC. Indeed, if the N-head is external to the RC, there is no double application of the operation Agree, which would lead to results that contradict our data, as discussed above.

A basic structure in the spirit of Manzini and Savoia (2011), as well as Platzack (2000), which does not imply the raising of the N-head, seems thus to be more adequate to account for the empirical data relating to CS, that we have collected. Indeed, our data show that the SGD pattern, which is derivable via Agree of the RP with both the external D and the external N, is overall accepted; the AGD and AGN types, which are derivable via Agree of the RP either with the external D or the external N respectively, are accepted with restrictions; finally, the SGN pattern, which is not derivable via Agree of the RP with either D or N, is overall rejected. Therefore, the sentences with the SGN type can simply be tackled as true cases of mismatching gender agreement patterns.

A final interesting result, which certainly deserves further investigation, is the observed discrepancy between the two groups of participants. Indeed, L2 learners seem to be more disposed to accept the AGD and AGN agreement types, perhaps because they are more vulnerable to gender cross-linguistic influences with respect to 2L1 bilinguals. The latter, however, are more inclined not to reject these patterns when neuter nouns are involved, and this fact is also noteworthy. Of course more data will be needed to verify if the analysis carried out thus far is on the right track.

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