

Free Merge, Agree, & Phase-Cancellation: An Account of (Anti-)That-Trace Effects*

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1. Introduction

In English and other languages, subject-extraction over long and short distances is restricted in various ways, tied to the realization of the complementizer (*that* in English). These restrictions constitute classic syntactic puzzles: the *that*-trace effect and its lesser-known cousin the anti-*that*-trace effect. Although these phenomena have received significant attention in the literature since Perlmutter 1968 (see Pesetsky 2015 for an overview), few unified accounts have been forthcoming (but see Douglass 2015, Deal 2016 for recent attempts).

This paper proposes just such an account, attributing *that*-trace and anti-*that*-trace effects to interactions between syntactic movement/Internal Merge (IM) at the phase-level, the timing of Agree, and the availability of a “phase-cancellation” operation (Chomsky 2013-2016; Epstein et al 2016). These proposals are informed by additional evidence from “anti-agreement” effects in Berber and other languages, and the conclusions are situated within a larger framework which assumes that the operation Merge applies freely, with wellformedness evaluated by interface conditions like Agree and Label.

The paper is organized as follows: Section 2 presents data on *that*-trace and anti-*that*-trace effects in English, along with supporting evidence from anti-agreement effects in Berber. Section 3 articulates the proposals related to Agree, integrating these with a framework relying on the notion of phase-cancellation. Specifically, I propose that Agree patterns with Label in that it cannot “see” traces of moved items. Furthermore, I propose that if Agree fails within a cycle, Feature Inheritance is not required. Instead, unvalued features may be valued when Agree is reactivated in the next phase. These proposals are

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applied to the data in Section 2, and an additional proposal is made to account for anti-agreement effects. Section 4 concludes with a summary.

2. Data

2.1 (Anti-)that-trace effects

Both *that*-trace and anti-*that*-trace effects involve restrictions on subject extraction, long- and short-distance, respectively, tied to the appearance of the complementizer *that*. *That* must be absent with long IM of the subject (=1a), but is obligatory with short IM (=1b). Non-subjects show no effect; *that* is simply optional (=2a-b).

- | | | |
|-----|---|--------------------------|
| (1) | a. the tiger_i that I thought *that / \emptyset t_i chased John | <i>that</i> -trace |
| | b. the tiger_i that / \emptyset t_i chased John | anti- <i>that</i> -trace |
| (2) | a. the man_i that I thought that / \emptyset the tiger chased t_i | no effect |
| | b. the tiger_i that / \emptyset John chased t_i | no effect |

Descriptions of these effects typically focus on the relation between C and the subject in Spec-TP. However, the nature of inter-phasal IM must also be considered. IM out of a phasal CP is successive-cyclic, requiring the moving phrase to stop in Spec-CP before moving further, if at all. As a result, the status of Spec-CP is an important factor contrasting the two effects. Compare (3a-b):

- | | |
|-----|---|
| (3) | a. the tiger_i that I thought [CP t_i [*that / \emptyset [TP t_i [T chased John]]]] |
| | b. [CP the tiger_i [that / \emptyset [TP t_i [T chased John]]]] |

The bracketing in (3a) shows that Spec-CP is occupied by a “trace” of the subject when the *that*-trace effect applies. In contrast, the anti-*that*-trace effect arises when Spec-CP is occupied by a “final” copy of the subject in (3b)—not a trace. The trace/non-trace distinction will prove important.

2.2 Anti-agreement effects

Anti-agreement (AA) effects are found in Berber (Tarifit dialect, Ouhalla 1993:479-480) and various other languages (see Baier 2016 for a detailed overview). They involve restrictions on the appearance of ϕ -agreement morphology with short-distance, but not long-distance, subject extraction. Long IM shows normal agreement (=4a), while agreement with short IM is prohibited (=4b).

- | | | |
|-----|---|--------|
| (4) | a. man tamghart_i ay nna-n qa *yzrin / t-zra t_i Mohand? | Normal |
| | which woman C said-3PL C see.PART / 3SG.F Mohand | |
| | “Which woman did they say saw Mohand?” | |
| | b. tamghart_i nni yzrin / *t-zra t_i Mohand | AA |
| | woman C see.AA / 3SG.F-see Mohand | |
| | “The woman who saw Mohand.” | |

Although these effects show variability across languages/dialects¹, they appear to be triggered specifically by short IM (questions, relativization, clefting, etc.). When taken together with (anti-)*that*-trace effects, AA effects demonstrate that long and short IM interact differently with both C and the manifestation of ϕ -agreement. These facts will be crucial to the account put forward in the next section.

3. An Account

An important question for any syntactic framework is how to characterize conditions determining the (un)grammaticality of sentences. *That*-trace, anti-*that*-trace, and AA effects call for some constraint(s) on IM and its interaction with C/ ϕ -agreement. Minimalist approaches tie these effects to the Merge-operation, but different frameworks assign wellformedness conditions to different parts of the language system. Two major approaches have been articulated.

The first approach characterizes wellformedness as syntax-internal, resting on the assumption that Merge is *feature-driven* (Frampton & Gutmann 1999; Adger 2003; Narita 2011, etc.). Thus, wellformedness is dependent on the successful valuation of features of lexical items. Such frameworks postulate a set of formal features that trigger Merge (usually IM). Phenomena like EPP- and successive-cyclic A'-movement, scrambling, topic/focus-movement, extraposition, and more are all feature-triggered. However, various problems have been identified, most notably the *ad hoc* nature of the feature-set and issues of derivational “lookahead” (see Fry 2014 for discussion).

These issues do not arise in the second approach—the one that will be adopted here—which assumes that Merge applies freely, untriggered by anything (Putnam 2010; Chomsky 2013, 2015, 2016; Epstein et al 2015). Wellformedness is instead evaluated in the interface between syntax and the systems of meaning and articulation. It is within this “Free Merge” framework that the proposals of this paper are situated. The next section turns to the operational details that will be used to capture *that*-trace and anti-*that*-trace effects; namely, the operations of phase-cancellation and Agree.

3.1 Phase-Cancellation

Previous accounts of the *that*-trace effect can be organized according to how they treat the “absence” of the complementizer C. Some take the absent C to be syntactically present, but phonetically null, varying with a phonetically overt *that* (viz. Pesetsky & Torrego 2001). Others assume that C is truly absent, the result of a deletion operation either in the syntax or at the interface. Recent work by Chomsky (2015) fits into this latter category. Chomsky assumes that deletion of *that* affects the process of phasal Transfer, since *that* is a phase-head C. Epstein *et al* (2016) dub this process “phase-cancellation” (henceforth PC). The derivation in (5a-d) illustrates:

¹As in the Tashlhit dialect of Berber, where agreement is morphologically reduced (Ouhalla 2005:275):

- (i) **irgazn** nna **ffegh-n-in** *ti*
 men C left-AA-PL
 “the men who left”

- (5) a. [**Cu** ϕ [DP ϕ [T [VP]]]] = Merge C
 b. [C $\#$ ϕ [**TP** DP ϕ [**T** T $\#$ ϕ [VP VP]]]] = Agree/Inherit/Label
 c. [\emptyset [TP DP ϕ [T' T $\#$ ϕ [VP VP]]]] = Phase-Cancellation

At the phase-level, C is merged (=5a), and operations like Agree and Label are activated, valuing unvalued ϕ -features on C with those of the subject DP ($u\phi \rightarrow \# \phi$) and labeling the phase-interior. T also receives $\# \phi$ from C by Feature Inheritance (Richards 2007), and the phase-interior is ready to be transferred (=5b). Before Transfer occurs, however, C may be deleted, arresting Transfer and leaving the phase-interior intact (=5c). Since ϕ -features of C have been valued and Transfer has been averted, the subject is free to extract further. Thus, for Chomsky, the absence of *that* means the true syntactic absence of the C-position itself.²

Why can't the subject extract *prior to* Transfer? Chomsky (2015:6) appeals to a property of the labeling-system to preclude this possibility, proposing that T is too “weak” to project as a label on its own and requires the subject DP in Spec-TP, where shared ϕ -features project as label, $\langle \phi, \phi \rangle$. This is intended to unify the *that*-trace effect with the EPP: the classic requirement that the subject must move to Spec-TP. On this approach, labeling requirements force the subject to both move to (=EPP) and remain frozen in (=that-trace) Spec-TP. As a result, the subject may extract only if PC occurs after Agree/Label apply. However, this account is problematic in various ways. Most importantly for this paper, Chomsky’s “weak T” approach wrongly predicts that the anti-*that*-trace effect should never arise, since PC is a prerequisite for subject IM. The anti-*that*-trace effect requires that C be present when the subject undergoes short IM. This translates into a prohibition on PC under short IM of the subject, and this should be incorporated into our framework.³

To conclude, the notion of PC offers a way of capturing *that*-trace effects, but this cannot be the whole story if we wish to incorporate anti-*that*-trace effects (along with AA effects). Furthermore, Chomsky’s “weak T” labeling approach makes the wrong predictions, and an alternative that derives the same results is preferable.

3.2 An Agree-based account

I adopt the PC-approach to the *that*-trace effect but reject the “weak T” labeling-based component. To be clear, the “weak T” property of Chomsky’s system is intended to account for why the subject cannot simply extract from the phase prior to Transfer. Under simplest assumptions, the subject should be able to extract to Spec-CP as soon as

²Nothing requires PC to manifest as deletion. If PC is a syntactic process, it allows for the removal of syntactic features while leaving other (namely, morphophonological) features intact. Other languages may simply modify C to mark PC, as in the French *que/qui* alternation.

³Chomsky’s notion of “labeling weakness” also runs into technical problems. Consider (ii) below:

- (ii) [C [α **DP**_i [β T_{weak} [γ *ti* VP]]]]

“Weak T” is unnecessary to force EPP-movement to Spec-TP, since IM is already needed to break the symmetric structure created between the subject DP and VP ($=\gamma$). Furthermore, filling Spec-TP with DP only helps label TP ($=\alpha$). The T'-level ($=\beta$) remains unlabelable, since Minimal Search should select T_{weak}.

C is added. The fact that Merge appears to be restrained in this case leads us to make a theoretical choice: either develop a syntax-internal constraint on Merge itself (as in a feature-driven approach) or develop a constraint on the output of Merge (as in a Free Merge approach).

Chomsky (2013) takes the latter course of action by characterizing labeling as a constraint on Merge-outputs. Free Merge may construct objects that are labelable and unlabelable, and the algorithm filters out the unlabelable outputs. While I ultimately reject the labeling approach to preventing subject extraction, I do adopt a Free Merge approach. Where the account here differs is in the particular constraint that I invoke, one that does not run into the same technical problems as “weak T” labeling; namely, the satisfaction of unvalued features via the operation Agree.

3.2.1 Agree and traces: *that*-trace effect

Before adopting Agree as a means of restricting subject-movement, some footwork must be done in order to justify (a) where Agree actually fits in a Free Merge system and (b) why Agree is superior to Chomsky’s labeling-constraint.

With respect to (a), it should be noted that Agree has historically functioned as a part of the trigger for IM in feature-driven accounts (e.g., Chomsky 1995+), and so in transitioning to a Free Merge system, it might be tempting to do away with Agree altogether. This is not the approach taken by Chomsky (2008, 2016), however. Chomsky takes the existence of unvalued features to be an independently-motivated empirical fact. Therefore, an Agree-operation is still required to value said features, even though they do not function to trigger Merge. Instead, Chomsky speculates that unvalued features may determine the phasal status of syntactic categories. The question of where exactly Agree fits into a phase-based syntactic derivation will be addressed below.

Now addressing (b), two observations form the basis of the argument for why Agree is superior to labeling as a means of capturing the freezing effect on the subject in Spec-TP. First, labeling between the subject DP and T is dependent on the presence of shared valued ϕ -features. Thus, Agree always precedes labeling. The requirement that $u\phi$ be valued by Agree is more well-established theoretically than the ill-defined notion of labeling-weakness, so why attribute the freezing-effect to labeling when Agree is already available? Second, looking at AA effects, it is clear that short-distance IM has an overt influence on agreement in some way. Since AA effects and the anti-*that*-trace effect arise in the same environment cross-linguistically, it is desirable to attribute them to the same underlying principle; hence, Agree is once again a better candidate.

Returning to the issue of where Agree fits into a Free Merge system, it is unclear how Agree can create the necessary freezing effect in its current form, since Agree is typically characterized as a trigger for IM. If we are serious about allowing Merge to apply freely, then Agree should be placed in the same category as Label, i.e. as an operation applying at the phase-level. The functional motivation for such an operation is clear if the existence of $u\phi$ is assumed: Agree renders $u\phi$ interpretable to the interface, just as Label renders syntactic objects interpretable. If a particular Merge-output does not conform to the conditions imposed by Agree/Label, it will not survive, but this does not mean that Merge is controlled or initiated by Agree/Label.

With this in mind, I propose that, as a phase-level operation, Agree should be subject to the same conditions as Label. This idea is already partly sketched by Chomsky (2013), since both Label and Agree respect Minimal Search. However, a different property of Chomsky's Labeling Algorithm is important here: the condition that traces are invisible to Label. The proposal for Agree is formulated in (6):

- (6) **Proposal:** Like Label, Agree cannot “see” traces of moved items.⁴

As a direct result of this proposal, if the subject undergoes long IM (=7), $u\phi$ on C will not be valued, and the derivation crashes.

- (7) *the tiger_i that I thought **that** t_i chased John
 = **the tiger** ϕ_i ... [**that** $u\phi$ [TP t_i [T chased ...]]] = Crash! (unvalued ϕ)

If IM prevents valuation by Agree, how can subjects ever be allowed to move long-distance at all? This is precisely where the PC-account comes into play. (8b-d) illustrates the relevant derivation for long-distance subject IM in (8a):

- (8) a. ^{OK}the tiger_i that I thought \emptyset t_i chased John
 b. [**that** $\# \phi$ [TP **the tiger** ϕ [T $\# \phi$ chased ...]]] = Agree/Label/Inherit
 c. [\emptyset [TP **the tiger** ϕ [T $\# \phi$ chased ...]]] = Phase-Cancellation
 d. **the tiger** ϕ_i ... [\emptyset [TP t_i [T $\# \phi$ chased ...]]] = Long IM of subject

At the phase-level (=8b), Agree values $u\phi$ on C with the subject. The phase is also labeled, and T receives $\# \phi$ from C by Feature Inheritance (Chomsky 2016). PC then arrests Transfer, leaving the phase otherwise intact (=8c). As a result, ϕ on C are valued with the subject, which then extracts from Spec-TP (not from Spec-CP!) (=8d). PC thus allows Agree to activate prior to IM. The combination of (6) and the PC-approach yields a configuration where C must delete after Agree to allow IM of the subject. If the subject moves prior to PC, $u\phi$ will not be valued.

While this provides a formal account of the *that*-trace effect equivalent to Chomsky's (2015) account, a problem arises when we extend our scope to the anti-*that*-trace effect, as noted in Section 3.1. Namely, an implicational relation has been created between PC and IM of the subject. If this relation held in all cases, then short IM of the subject should *also* require PC, but this is incorrect. Instead, the anti-*that*-trace effect applies in short IM contexts, making C obligatory. Put another way, some property of short IM actually *prevents* PC. The next section provides a proposal for what this property could be.

3.2.2 Anti-*that*-trace & Antilocality

Let us consider the sequence of events that would arise if PC applied with short IM of the subject. Prior to merger of C, the subject DP would be found in Spec-TP. Once C is merged, the operations of Agree, Inherit, and Label would apply, after which comes PC. This neutralizes the phase-head and stops Transfer. The subject DP is still in Spec-TP. At this point, the subject undergoes short IM, but what position would IM of the subject

⁴For a similar chain-based definition of Agree within a Free Merge-based framework, see Obata et al 2015.

actually target? IM would occur from Spec-TP to, essentially, another specifier of Spec-TP, since C no longer exists. The derivation in (9b-d) illustrates:

- (9) a. *the tiger_i Ø *t_i* chased John
 b. [**that**_{#φ} [TP **the tiger**_φ [T_{#φ} chased ...]]] = Agree/Label/Inherit
 c. [Ø [TP **the tiger**_φ [T_{#φ} chased ...]]] = Phase-Cancellation
 d. [TP? **the tiger**_{φ_i} [Ø [TP *t_i* [T_{#φ} chased ...]]]] = Short IM of subject

The movement shown in (9d) is presumably where the problem arises. Two options are available. First, considering that the subject ends up occupying another Spec-TP position, it could be that short IM of the subject after PC is “vacuous” in that it cannot be parsed as a relative clause. It just looks like a matrix clause (subject in Spec-TP, T hosting _{#φ}, etc.).

Second, looking at the structural nature of the apparently-illicit movement, we can see that IM of the subject in (9d) involves IM from a lower Spec-TP to a higher Spec-TP *within the same TP*. This could easily be characterized as a violation of Antilocality, which prohibits movements that are “too short”. Various definitions of “too short” have been proposed (see e.g., Grohmann 2003, Abels 2003, Erlewine 2015), but it should be noted that phrasal movement from specifier to specifier within a single phrasal projection is the shortest kind of movement imaginable that still respects Extension. As such, if Antilocality is indeed a legitimate principle of wellformedness, it must at minimum prevent the kind of movement evidenced in (9d).

3.3 Short IM & Delayed Agree

At this point, *that*-trace and anti-*that*-trace effects have been captured through a combination of (6), PC, and a restriction on short IM under PC. One question remains: If the subject is able to extract short-distance and PC is prohibited in such cases, how do the unvalued _φ-features of C get valued? This section targets the issue with another proposal that comes as a direct consequence of the status of Agree as an output-filter:

- (10) **Proposal:** If Agree fails to value features in one phase, it may delay until the next phase (“Delayed Agree”).

This addition to the nature of Agree is motivated by considerations of Feature Inheritance (FI). Richards (2007) proposes that FI is motivated by principles of economy requiring feature-valuation and Transfer to be simultaneous. _Φ-features on C copy onto T in order to place said features within the phase-interior at the same time that Transfer occurs. But what if, as assumed in this account, _{uφ} on C aren’t necessarily valued in the first pass of Agree? There is no reason that they could not remain on C, in which case no crash would result, since they would not have been transferred. These _{uφ} could then be valued in the *next* phase when Agree activates again, provided that a suitable goal is present. As a result, IM of the subject will not result in crash as long as it is short, i.e. IM to Spec-CP and no further. Valuation applies in a “Spec-Head” configuration, as in (11):

- (11) ^{OK}the tiger **that** *t* chased John
 = [CP **the tiger**_{φ_i} [**that**_{#φ} [TP *t_i* [T chased ...]]]] = Delayed Agree

I believe this accords with the status of Agree as an output filter. Agree evaluates each phase independently, and if a transferred phase contains no $u\phi$, no violation occurs. Under (6), however, Delayed Agree can only happen successfully *if the goal does not move again* in the next phase, in order to remain visible. It is because of this that PC is only required to license long IM of the subject, since, in long IM contexts, the subject vacates Spec-CP, leaving a trace that is invisible to Agree and preventing feature-valuation. In such cases, a true derivation-crash will result, as in (12):

- (12) *the tiger that I thought t_i **that** t_i chased John
 = the tiger ϕ_i ... [CP t_i [**that** $u\phi$ [TP t_i [T chased ...]]]] = Crash! (unvalued ϕ)

3.3.1 Anti-agreement & optional Feature Inheritance

Recall from Section 2.2 that languages with AA effects show restricted ϕ -agreement in contexts of short subject IM. Agreement may be absent or reduced, subject to dialectal variation (see fn. 2). It is notable that AA occurs in contexts where Delayed Agree applies, and so we may conclude that something about the nature of allowing features to remain on C interferes with how those features manifest morphologically.

Consider again the notion of Feature Inheritance. If, as argued, Agree can be delayed and FI is not obligatory in such contexts, nothing actually forces FI to occur afterward. Instead, ϕ -features could remain on C after valuation, with the moved subject in Spec-CP. Because FI is not forced, a degree of optionality is introduced into the grammar, and I claim that whether or not FI actually applies in a “retroactive” manner is a potential point of crosslinguistic variation. This is the motivation behind the proposal in (13):

- (13) **Proposal:** FI can show crosslinguistic variability under Delayed Agree.

As a result, FI may still occur, but different grammars may encode different feature-distributions (see Ouali 2008 for similar proposals). This is precisely what we observe in AA-languages like Berber. In Tarifit Berber (=14a), no FI occurs, and the verb surfaces without ϕ -agreement. In Tashlhit Berber (=14b), partial FI occurs and the verb surfaces with [number] features only, leaving [person/gender] on C. In English (=14c), on the other hand, complete FI always occurs.⁵

- (14) a. *No FI (Tarifit Berber)*
 = [CP **tamghart** ϕ_i [C $\#$ ϕ [TP t_i [**yzrin**_{AA} Mohand]]]]
 b. *Partial FI (Tashlhit Berber)*
 = [CP **irgazzn**_[3PLM] i [C $\#$ _[3M] [TP t_i [**ffegh-n-in**_[PL]]]]]
 c. *Full FI (English)*
 = [CP **the tiger** ϕ_i [C $\#$ ϕ [TP t_i [**T** $\#$ ϕ chased ...]]]]

⁵Some languages may even encode multiple options for FI. Schneider-Zioga (2000) reports that the Bantu language Kinande allows *optional* AA, both normal agreement and AA being equally possible.

4. Conclusions

Under the assumption that Merge is free, untriggered by formal features, Agree must find a new place in the framework. I have proposed that Agree should be categorized as a phase-level operation, evaluating Merge-outputs and filtering out illicit derivations. Both Agree and Label respect Minimal Search—the former in determining the closest goal for valuation and the latter in determining the label of a syntactic object—and traces are invisible to both operations. *That*-trace and anti-*that*-trace effects derive from the interaction between this version of Agree and the outputs of Free Merge, along with phase-cancellation and (potentially) Antilocality principles.

When the subject extracts to Spec-CP and $u\phi$ on C remain unvalued, I propose that these features are not forced to undergo FI, and may instead remain on C into the next phase to be valued when Agree activates again. “Delayed Agree” technically revives the “Spec-Head” configuration for agreement, but only local to a phase-head. The possibility of Delayed Agree accords with Agree as an output-filter, rather than as syntax-internal.

Finally, AA effects appear to arise in the specific context when Agree is delayed, and I have proposed that because FI is not forced in such cases, variability in whether or not FI actually occurs retroactively is possible. AA effects show cross-linguistic and dialectal variation, in line with this perspective on the “optional” nature of FI. In other words, because FI is non-obligatory in Delayed Agree contexts, its application after the fact is a point of free variation in grammars, with grammars choosing to apply FI differently.

The goal of this paper has been to demonstrate the efficacy of a Free Merge approach to syntactic operations. To that end, I have recharacterized a central operation of Minimalist syntax in a manner that preserves its important function, while simultaneously repurposing it to capture classic syntactic puzzles like *that*-trace and anti-*that*-trace effects in a more unified way.

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