

Coercion by modification — The adaptive capacities of event-sensitive adnominal modifiers*

Sebastian Bücking
University of Tübingen

Claudia Maienborn
University of Tübingen

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Abstract This paper is about coercive meaning adaptations as triggered by modifiers. It pursues two objectives. First, we argue that coercion by modification is rooted in the linguistic system. More specifically, given a pending type-conflict between a modifier and its target, fine-grained lexical typing information is shown to both license and constrain adaptive options. Notably, such a dynamic lexical semantics integrates conceptual knowledge resources into rigid compositional mechanisms without giving up their principled distinction. Second, we reconcile coercion by modification with the standard conception of modification as a type-preserving operation. However, we also argue that the coercion facts cannot be handled within rule-based approaches to modification. The merits of the proposed dynamic approach to lexical semantics are exemplified by a detailed investigation of the subtly differing coercive potentials of event-sensitive adjectives such as *schnell* ‘quick’, *flink* ‘nimble’, and *rasch* ‘rapid’ in German. It is spelled out in terms of Asher’s (2011) Type Composition Logic.

Keywords: modification, coercion, underspecification, Type Composition Logic, event semantics, ambiguity

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1 Introduction

Modern theories of lexical semantics strive to reconcile the flexibility and fine-grainedness of lexical meanings with the rigidity of a formal semantic framework; see, for instance, Bierwisch 1982, 1997, 2007, Pustejovsky 1995b, 2011, 2012, and Asher 2011. The crucial problem that such theories aim to solve consists in properly accounting for the contextually modulated interpretive freedom of lexical items, while preserving some version of Fregean compositionality as a core combinatory mechanism. The challenges for such an endeavor become particularly evident in the case of modification. By virtue of their rather loose structural integration, modifiers are particularly amenable to meaning adaptations triggered by their linguistic and extra-linguistic context. This raises the question of how the lexicon, compositionality, and pragmatics interact in order to derive the observed range of interpretations. A prominent case discussed in the literature is the flexible interpretation of attributive adjectives such as English *fast*. As has been observed, for instance, by Pustejovsky (1995a), Lascarides & Copestake (1998), and Asher (2011), the adjective *fast* not only modifies eventive nouns, as in (1a), but also combines with object-referring nouns, as in (1b)–(1d).

- (1) a. a fast race
 b. a fast car
 c. a fast book
 d. a fast motorway

If we assume that the semantic contribution of *fast* consists in expressing high velocity of an event and adopt, furthermore, a standard semantics for intersective modification according to which the modifier adds a predicate to its target argument, then the meaning composition for (1a) will be derived strictly compositionally, leading to the interpretation “race of high speed”; see Heim & Kratzer’s (1998) rule Predicate Modification for one implementation and, for instance, Higginbotham 1985, Morzycki 2016, McNally 2016, or Bücking 2018 for further discussion. For the examples (1b)–(1d), however, it is not obvious how the resulting meaning could be calculated on the basis of the meaning of the existing parts. While (1b) is most plausibly interpreted as a car moving at high speed, the preferred interpretations for (1c) are that of a book that is read or written with high speed; and (1d) will most probably be interpreted as a motorway that permits traffic of high velocity. These examples suggest that the combination of *fast* with object-denoting nominals

leads to an eventive meaning adaption; and they illustrate furthermore that there is a considerable range of freedom in specifying the contextually most appropriate event. The questions to be answered then are: what is the source of this additional event argument? How does the compositional machinery deal with it? And what are the conditions and limitations of its contextual specification?

Several proposals have been made to answer these questions. According to the theory of the Generative Lexicon as proposed by Pustejovsky (1995a,b), an attributive adjective not only has access to the referential argument of a noun but can also be linked to additional information coded within the noun's qualia structure. In particular, a noun's telic or agentive quale can provide suitable target events for eventive modifiers such as *fast*. More specifically, Pustejovsky (1995a: pp. 81–83) proposes that *fast* is subtyped for events accessible via the telic quale (which specifies the function of an object). Cars, for instance, are made for driving. Thus, Pustejovsky's system would derive "car driven with high velocity" as the interpretation for (1b); see Pustejovsky 1995a: p. 82. Analogously, (1c) would be interpreted as a book read with high velocity and (1d) as a motorway that permits driving with high velocity.

The merit of Pustejovsky's proposal is that it has unveiled the dynamicity and systematicity with which lexical knowledge interacts in building up complex meanings. However, as has been criticized repeatedly, Pustejovsky's qualia structure does not seem to be the right means for dealing with this interpretive flexibility; see, for instance, Lascarides & Copestake 1998: pp. 391–395, Egg 2003: pp. 168–172, and Asher 2011: pp. 74–87. Qualia structures are too poor to account for the whole range of contextually licensed adaptations. For instance, under appropriate contextual conditions the NP *a fast book* could also be understood as referring to a book that was illustrated or copy-edited or turned into a film with high velocity. Furthermore, many pieces of knowledge that are similarly relevant for the interpretive flexibility of lexical items have no natural place within Pustejovsky's qualia structure. Take as an example the NP *a fast dog*. Its most natural interpretation is that of a dog that runs with high speed. Yet, running is not the telic role of dogs. Dogs are not made for running. As Pustejovsky points out, only artifacts have a telic role specification; see, for instance, Pustejovsky 2011: p. 1408. Thus, while Pustejovsky's system provides a plausible default interpretation for *a fast car* by exploiting the telic role of the head noun, it cannot offer an interpretation for *a fast dog*, because the information that running is a typical activity of dogs is not part of the qualia structure of *dog*. Given the

obvious parallels in the meaning constitution of *a fast car* and *a fast dog*, this is a rather unsatisfactory outcome. Moreover, this flaw points towards a deeper problem of Pustejovsky’s proposal. By assuming qualia structures, Pustejovsky opens the lexicon and imports a small part of world knowledge into the lexical system — basically knowledge about how objects come into existence and what they are typically used for. But, as our short discussion of *fast* has already shown, far more world knowledge would actually be needed in order to account properly for the observed interpretive flexibility. However, if all this world knowledge were incorporated, the lexical system and the compositional machinery would be in danger of collapsing.

An alternative analysis for the kind of meaning variability illustrated above is provided by a theory of radical underspecification as proposed by Dölling (2003, 2005, 2014). In Dölling’s take, both the semantics of lexical items and their compositional combination are underspecified by systematically including semantic parameters that call for pragmatic enrichment. More specifically, a predicative modifier such as *fast* (as any predicate of type $\langle e, t \rangle$) will not combine with its target argument directly, but triggers the insertion of a compositional operator (called *met* in Dölling 2003, 2005 and *coerce* in Dölling 2014) that links the modifier’s contribution to the target argument only indirectly. This is achieved by introducing a new variable which is related to the compositional target argument in a semantically underspecified way. If we neglect some further intricacies of Dölling’s proposal that are irrelevant for our present concerns, the result of combining *fast* with a common noun as in (1) amounts to a semantic representation along the lines of (2) with “noun” abbreviating the semantic contribution of the head noun; compare Dölling 2003: p. 523, Dölling 2014: p. 222.

$$(2) \quad \lambda x \exists e [\text{noun}(x) \wedge R(e, x) \wedge \text{fast}(e)]$$

Under this analysis, all examples in (1) are subject to the very same compositional derivation and yield the very same kind of semantic structure: the contribution of attributive *fast* consistently consists in adding an eventive predicate that is related via an underspecified relation R to the head noun’s referential argument x . The task of identifying an appropriate event e and specifying its relation to x is delegated to a component of pragmatic enrichment. In this take, all examples in (1) are treated on a par compositionally. What makes (1a) different from (1b)–(1d) is that the pragmatic specification leads to ‘identity’ as the default specification for R in the case of (1a).

In short, Dölling’s approach allows for flexible interpretations by prophylactically inserting additional variables in the course of composition, which serve to defer the identification of a predicate’s target until pragmatic specification takes place. Dölling’s proposal is sufficiently general to be able to account for arbitrary contextual modulations of an interpolated event variable. That is, the interpretation of, for instance, *a fast book* is not limited to default activities that we associate with books such as reading or writing, but can also include — given an appropriate context — a reading such as “a book that is turned into a film with high velocity”. The task of identifying a suitable event is exclusively delegated to pragmatics; see, for instance, the remarks in [Dölling 2014](#): p. 218 on deriving a pragmatically enriched “Parameter-Fixed Structure” from the underspecified “Semantic Form” via abductive reasoning. While Dölling’s theory is therefore surely broad enough in scope, one might ask, however, whether its scope is possibly too broad. Does it allow us to formulate the right kind of restrictions? First of all, is the flexible interpretation of modifiers as illustrated in (1) really a case of (radical) underspecification, which means that there is no principled distinction (as far as compositionality is concerned) between the combination of an eventive modifier with an eventive noun (1a) and its combination with an object noun (1b)–(1d)? In an alternative coercive account, (1a) would receive a strictly compositional interpretation and its target argument could be identified on purely grammatical grounds, rather than resorting to default identification in the course of pragmatic enrichment. Moreover, in a coercive account only (1b)–(1d) would require particular pragmatic measures in order to solve a combinatory conflict. Secondly, is the task of finding appropriate specifications for additionally integrated variables that serve to solve a combinatory conflict really just an issue of pragmatics, or does the linguistic system, in particular the lexicon, contribute more to this task than Dölling envisaged?

In the following, we want to argue for a coercive account that factors lexical constraints into its set-up and makes a principled distinction between strictly compositional interpretations and adaptations that solve a combinatory conflict. In accord with Pustejovsky, we take the interpretive flexibility observed for (1b)–(1d) to be an instance of coercion. Yet, unlike Pustejovsky, who locates the source of the extended interpretive potential of an attributive modifier in the lexical structure of the head noun (in terms of its qualia structure), we assume that it is the modifying predicate, that is, the adjective in this case, that hosts the relevant adaptive capacities. Our proposal shares with Dölling’s the broader coverage, which also extends to more spe-

cific, contextually induced interpretations. Yet, unlike Dölling, we advocate a more balanced division of labor between the lexicon, composition, and pragmatics. In particular, following Asher 2011, we will argue that the coercive potential of linguistic expressions is crucially specified and restricted through the lexicon. A case study on the semantics of German *schnell* ‘quick’ vs. *flink* ‘nimble’ vs. *rasch* ‘rapid’ will serve as a test case for exploring how much of a lexical item’s interpretive flexibility is anchored in the lexicon and what is due to general pragmatics. Our proposal is based on Asher’s (2011) theory of coercion, which will be spelled out in more detail below. However, in order to get the coercion facts right, Asher adopts a nonstandard analysis of modification according to which modifiers are optional arguments of the heads they attach to. Instead, we will propose a new analysis of coercive modification which conforms to the more standard view that modifiers are endotypical functors that do not change the arity of their modifyees (see McNally 2016 and Bücking 2018 for general overviews).

The aim of the present paper is thus twofold. First, the proposed semantics for *schnell* vs. *flink* vs. *rasch* serves as an illustration of how fine-grained lexical semantic distinctions feed into meaning composition and constrain the range of potential pragmatic adaptations in the case of coercion. This discussion will also provide new empirical arguments for deciding among underspecification and coercion approaches. Secondly, the paper reconciles Asher’s framework of Type Composition Logic with a more standard analysis of intersective modification. As our discussion will eventually make clear, modeling the neat semantic connections between a modifier and its target that coercive modification appears to be based on does in fact challenge the assumption of a separate compositional rule such as Heim & Kratzer’s (1998) Predicate Modification. However, this challenge can be mastered without abandoning core assumptions about the nature of modification.

2 Coercion by adnominal modification: Overview of the relevant data

2.1 Foundational observations

To begin with, we will overview foundational observations that characterize coercion by event-sensitive adnominal modification in general. The behavior of *schnell* (‘quick’) in German serves as a case in point; see (3). Asher (2011: p. 233f.) briefly discusses an analogous example. However, the empirical and

theoretical discussion in this paper will go well beyond Asher's cursory treatment.

- (3) Paul rauchte eine schnelle Zigarette.
Paul smoked a quick cigarette

The first simple observation is that, analogously to *fast* from the introduction, the modifier *schnell* 'quick' must relate to events. Since the given nominal target *Zigarette* 'cigarette' denotes a physical artifact and, thus, does not comply with this requirement, the composition must facilitate the interpolation of an appropriate eventive entity. According to the most plausible reading, the cigarette was smoked at high speed. An adequate account should thus reconcile two intuitions: on the one hand, the lexical entries for *schnell* and *Zigarette* should reflect the common-sense intuition that the former ranges over events, while the latter ranges over physical artifacts. On the other hand, the account must enable their mediation by an appropriate event. Notably, there is no reason to believe that this resolution of the pending conflict changes the actual meaning of the predicates combined; in other words, their standard interpretation should be kept intact throughout the resolution process.

Second, several observations indicate that the resolution should be locally operative. That is, the typing requirements that are associated with the compositionally active argument of the modified phrase should be independent of the resolution and solely sensitive to the presuppositions coming along with the head constituent.¹ For instance, predicates such as *rauchen* 'smoke' take objects that can be consumed, but not events; compare (4a) as opposed to (4b). Crucially, (5) shows that modification via *schnell* does not change the distribution of the nominal head.

- (4) a. Paul rauchte eine Zigarette.
Paul smoked a cigarette
b. #Paul rauchte ein (schnelles) {Rauchen / Drehen} der Zigarette.
Paul smoked a quick {smoking / rolling} of the cigarette
- (5) Paul rauchte eine schnelle Zigarette.
Paul smoked a quick cigarette

¹ See Asher 2011: p. 233f. for brief remarks on locality effects for *quick* in English and Bücking 2012, Bücking & Buscher 2015, and Maienborn & Herdtfelder 2017 for further discussion. One should note that not all coercions seem to be local. This paper will however not discuss potential candidates for nonlocal coercions.

The same pattern holds for the subject; see the examples in (6)–(7) with the predicate *zu Boden stürzen* ‘fall to the ground’, which is sensitive to physical objects.

- (6) a. Pauls Pilzsuppe stürzte zu Boden.
Paul’s mushroom soup fell to ground
- b. #Pauls (schnelles) Zubereiten der Pilzsuppe stürzte zu Boden.
Paul’s quick preparation of the mushroom soup fell to ground
- (7) Pauls schnelle Pilzsuppe stürzte zu Boden.
Paul’s quick mushroom soup fell to ground

Furthermore, counting pertains to the type of object provided by the modifier, modification notwithstanding; see (8) with the quantifier *drei* ‘three’, which clearly counts cigarettes, but not events.

- (8) Paul rauchte drei schnelle Zigaretten
Paul smoked three quick cigarettes
≈ Paul smoked 3 cigarettes.
≠ Paul was involved in 3 smoking events involving 1 cigarette.

Crucially, these locality effects bring out that the resolution process must be conceived of not as random, but rather as a rule-based interaction between typing information and ordinary composition. More specifically, the account should integrate a structure-sensitive means for adequately manipulating the percolation of typing information and thereby determine the location where it becomes relevant.

Third, the type of the implicit mediating eventuality is generally not rigidly specified (recall the discussion in the introduction). Its specification can take advantage of both local and global knowledge resources. Local inferences are based on the minimal predication consisting of modifier and modifier. For instance, as cigarettes are typically associated with smoking events, the NP *schnelle Zigarette* ‘quick cigarette’ suggests that it denotes cigarettes that are smoked quickly. By contrast, an NP such as *schnelle Pilzsuppe* ‘quick mushroom soup’ suggests that it denotes soups that are prepared or consumed quickly. This indicates that one can already grasp potential specifications at the NP level. In other words: while the conceptual specification necessarily follows the composition of the respective relevant structure, it can

already start before completing the composition of sentences as wholes. This is less trivial than it seems; it calls for an analysis at the semantics-pragmatics interface that keeps compositional and noncompositional meaning components apart while allowing them to directly interact with each other. Furthermore, despite locally operative defaults, the analysis must also assure that broader contextual information can always override local inferences (see as well the corresponding axiomatization by [Lascarides & Copestake \(1998\)](#), who argue that discourse always wins over lexical defaults). For instance, in (9), the given context clearly promotes the rolling of cigarettes by Paul, which renders the default association of cigarettes with smoking events inoperative. Accordingly, the most plausible reading here is that the cigarettes are rolled quickly.

- (9) a. Context: in order to calm down before his date with Bella, Paul was going to roll some cigarettes.
b. Schon nach drei schnellen Zigaretten klingelte es an der Tür.
already after three quick cigarettes ringed the bell at the door
'After just three quick cigarettes the door bell rang.'

Fourth, contextual information is not only relevant for the specification of additional implicit material, but it can also manipulate its conflict-based interpolation; see [Dölling 2003, 2005](#) and [Egg 2005](#) for further discussion. Usually, the relevant type conflict is rooted in fixed lexical knowledge: the modifiee denotes objects of a type that is invariantly incompatible with the modifier's presuppositions. However, such a conflict can also be due to contextual information, irrespective of a lexical fit. The example in (10) provides a case in point.

- (10) Paul hat gesagt, dass wir uns so bald wie möglich zu einer ausführlichen Diskussion treffen sollen. Das heißt, wir brauchen ein schnelles Meeting.
Paul has said that we so soon as possible for a extensive discussion meet should that is we need a quick meeting
'Paul said that we should get together for an extensive discussion as soon as possible. That is, we need a quick meeting.'

Since, lexically, *meeting* denotes an eventuality and *schnell* presupposes the application to eventualities, the modifier could directly predicate of its target that it lasts for a short amount of time.² However, the context makes explicit that modifiers of high speed can relate to the way a meeting comes into being, while it provides good reasons for their being incompatible with meetings as such. This suggests narrowing down the presuppositions of *schnell*: it rules out the application to meetings. Accordingly, the resulting type conflict for *schnelles Meeting* licenses the interpolation of an additional underspecified eventuality with the explicitly given target — that is, the meeting — as one of its arguments. In the given context, the most plausible specification for this eventuality is that the meeting must be organized within a short amount of time.

In sum, an adequate analysis of coercion by adnominal modification should capture the following basic traits. First, lexical items bear typing information that is responsible for a conflict-based coercion and that is kept intact throughout the resolution process. Second, the coercion operates on a local level between modifier and modifiee. Third, the specification of entities that mediate between the conflicting types is sensitive to both local lexical defaults and broader contextual knowledge. Finally, contextual information can trigger conflict-based coercion not called for by fixed lexical information.

2.2 The role of fine-grained lexical knowledge in coercion

In light of the data overviewed so far, it is tempting to conceive of coercion as a fairly general pragmatic repair strategy that is largely independent of individual lexical items. The previous work has not paid much attention to the question of whether this putative independence is in fact true. One exception is Asher (2011), who argues against this assumption.³ His chief case

² In fact, this is a possible interpretation. According to the context, (10) is then simply judged as false — the hearer may react by saying: “No, that can’t be true. You just said that we are supposed to have time for extensive discussions.” This option is rather marked because the speaker seems to contradict her own words, which is at odds, in particular, with the introductory phrase *das heißt* ‘that is’. Therefore, the coercion-based interpretation sketched in turn is more plausible.

³ In addition to Asher, there are some further scholars who have argued more recently that pragmatic repair strategies should be constrained by lexical information. For instance, Kennedy & McNally (2010) discuss constraints on color adjectives, Del Pinal (2015, 2018) discusses constraints on privative adjectives, and Hawthorne, Rothschild & Spectre (2016) discuss the lexical semantics of the attitude verb *believe*.

in point is complement coercion by aspectual verbs such as *finish* and *stop*, as in (11) (= Asher 2011: (3.55b)/(3.55d)) and (12) (= Asher 2011: (3.55c)).

- (11) a. Mary finished the apple.
 b. Mary stopped the apple.
- (12) Mary stopped eating the apple.

The pair in (11) shows that both *finish* and *stop* license event coercion. However, their interpretations differ considerably. While (11a) for instance conveys that Mary finished eating the apple, (11b) conveys that Mary stopped a movement of the apple. Most notably, (11b) cannot receive a consumption interpretation despite the fact that a corresponding explicit event nominal would be feasible, as in (12). Asher concludes that coercion is sensitive to individual lexical items. In this section we will take up this observation and argue that fine-grained lexical knowledge plays a crucial role not only in complement coercion but also in coercion by modification. The more general upshot will be that the role of lexical details in meaning adaptations is pervasive and thus deserves more systematic attention than it has received to date.

Our chief case in point is the coercive potential of the adjective *flink* ‘nimble’. *Flink* is similar in meaning to *schnell* ‘quick’. It also presupposes the application to an eventuality and predicates of it high velocity. However, the following observations point to fine-grained differences between both adjectives. As a rough intuitive characterization of contrasts should suffice for the main purpose of this section, we will not dwell on a thorough descriptive overview here.

The first observation relates to the case where *flink* directly combines with an eventuality. The requirements for this eventuality are more specific than those for *schnell*; namely, the eventuality must consist of small fast movements — either because it itself is a movement that is plausibly composed of small fast movements, as in (13a), or because it can include such movements, as in (13b). Accordingly, *flink* does not relate to the target eventuality as a whole, but it contributes to the manner in which the eventuality unfolds, that is, to its internal dynamic structure.⁴

⁴ There are further aspects of interpretation that distinguish *flink* from *schnell*. In particular, *flink* suggests a positive evaluation of the way someone or something moves, whereas *schnell* is neutral in this respect. However, we will set aside this difference because it does not seem to have a direct bearing on the respective coercive potentials.

- (13) a. der flinke Griff / die flinke Bewegung
the nimble grip / the nimble movement
- b. die flinke Herstellung einer Zigarette / der flinke Lauf
the nimble making of a cigarette / the nimble run
übers Feld
over the field

The following findings corroborate this characterization: for one, *flink* cannot single out a short running time of eventualities as wholes, which is possible for the kindred *schnell*; see the contrasts in (14) and (15).

- (14) ‘the speech that takes little time’
- a. #die flinke Rede
the nimble speech
- b. die schnelle Rede
the quick speech
- (15) ‘the smoking event that takes little time’
- a. #das flinke Rauchen einer Zigarette
the nimble smoking of a cigarette
- b. das schnelle Rauchen einer Zigarette
the quick smoking of a cigarette

Moreover, *flink* is inappropriate if the target eventuality does not provide an internal structure that builds on small fast movements. Compare the minimal contrasts in (16): (16a) is fine because Paul’s opening of the door can unfold in terms of various small fast movements that Paul is carrying out. By contrast, (16b) and (16c) are deviant because both the door’s opening and its shutting usually amount to unidirectional one-piece movements. As (17) shows, *schnell* is well formed in all cases.

- (16) a. Pauls flinkes Öffnen der Tür
Paul’s nimble opening of the door
- b. #das flinke Sich-Öffnen der Tür
the nimble REFL-opening of the door
- c. #das flinke Zufallen der Tür
the nimble shutting of the door
- (17) a. Pauls schnelles Öffnen der Tür
Paul’s quick opening of the door

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- b. das schnelle Sich-Öffnen der Tür
the quick REFL-opening of the door
- c. das schnelle Zufallen der Tür
the quick shutting of the door

Notably, the effect does not primarily depend on the presence of an agent. Examples such as (18) show that it is rather the structure of the path that matters: while the needle is not an agent, its overall movement can very well be composed of small fast submovements.

- (18) die flinke Bewegung der Sticknadel
the nimble movement of the embroidery needle

Similar considerations hold for (19). The example cannot convey that a car goes from A to B in a straight line; however, it can describe a scenario where the car changes directions and, thus, gives rise to a path that can be completed by distinguishable small fast movements. This also explains why the car should be a small agile beetle rather than a sedate stretch limousine. The corresponding example with the adjective *schnell* is again not sensitive to this distinction; see (20), which would be fine for both scenarios.⁵

- (19) die flinke Fahrt des Autos (= des Käfers / #der
the nimble driving of the car (= of the beetle / of the
Stretchlimousine)
stretch limousine)
- (20) die schnelle Fahrt des Autos (= des Käfers / der
the quick driving of the car (= of the beetle / of the
Stretchlimousine)
stretch limousine)

⁵ We have emphasized that agentive control is not the prime reason for rendering *flink* felicitous. This does not exclude that the relevant path structures build upon some indirect control. So for (18) and (19), the movements can be conceived of as being controlled by the embroiderer or the driver. In fact, examples not involving any control over the relevant path structure such as *#das flinke Zittern des Körpers vor Kälte* (lit. 'the nimble shivering of the body from cold') are infelicitous. We will remain agnostic as to the question of whether the restriction to small fast movements should be amended by some constraint on indirect control or whether the path structures as such should be made sensitive to some further fine-tuning (obviously, the shivering body does not move as a whole). It should, though, be clear that the lexicalist approach is well equipped for factoring such additional constraints into the selectional restrictions of *flink*.

The second observation relates to the case where no eventuality is explicitly given. Like *schnell*, *flink* licenses the interpolation of an eventuality if combined with noneventive nominals; see (21)–(23).

- (21) a. eine flinke Forelle
 a nimble trout
 ‘a trout that swims nimbly’
 b. ein flinker Abwehrmann
 a nimble defender
 ‘a defender that runs nimbly’
- (22) a. ein flinker Koch
 a nimble cook
 ‘a cook that nimbly prepares some food’
 b. ein flinker Pilzsammler
 a nimble mushroom gatherer
 ‘a gatherer that nimbly gathers mushrooms’
- (23) eine flinke Sticknadel / ein flinkes Messer
 a nimble embroidery needle / a nimble knife
 ‘a {needle / knife} that moves nimbly’

However, *flink*'s adaptive potential is more restricted than that of *schnell*. The interpolated eventualities in (21)–(23) invariably involve small fast movements of the entity that is described by the respective explicit head noun; for instance, the swimming in (21a) consists of small fast movements by the trout and the preparation in (22a) is said to unfold in terms of small fast movements by the cook. As a consequence, *flink* does not allow the interpolation of transitive event predications to which the head noun contributes the lowest-ranked argument. Accordingly, (21a) cannot mean that the trout is nimbly prepared; it, thus, does not match a situation where a cook makes nimble movements while preparing a trout. The suggested restriction is made particularly evident by examples such as in (24). The respective head nouns prompt the mediation via transitive event predications, but they do not provide entities that can move in a fast way without being affected by some external force. Therefore, *flink* is odd here. By contrast, *schnell* is more liberal: (25a) can mean either that the trout moves quickly or that it is prepared quickly; correspondingly, the counterparts of (24a) and (24b) in (25b) and (25c) are felicitous.⁶

⁶ The attentive reader might notice that there are also restrictions that are identical for both *flink* and *schnell*; for instance, neither *eine schnelle Tür* ‘a quick door’ nor *eine flinke Tür*

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- (24) a. #eine flinke Pilzsuppe
a nimble mushroom soup
'a mushroom soup made nimbly'
b. #eine flinke Zigarette
a nimble cigarette
'a cigarette rolled nimbly'⁷
- (25) a. eine schnelle Forelle
a quick trout
'a trout {that moves quickly / that is made quickly}'
b. eine schnelle Pilzsuppe
a quick mushroom soup
'a mushroom soup {made / eaten} quickly'
c. eine schnelle Zigarette
a quick cigarette
'a cigarette {smoked / rolled} quickly'

One might suppose that this restriction mirrors the way in which *flink* plus an event noun can be interpreted one-to-one. But this is not the case. Crucially, if, as in (26) (or in (13b) above), *flink* encounters an explicitly given corresponding eventuality, the composition succeeds, which shows that there is no principled ban on combining *flink* with the pertinent relations.

- (26) a. die flinke Zubereitung einer Forelle
the nimble preparation of a trout
b. das flinke Drehen einer Zigarette
the nimble rolling of a cigarette

Therefore, any adequate analysis must render the combinatorial options dependent on whether the composition proceeds directly or triggers a conflict-based repair. This finding for coercion by modification corroborates Asher's (2011) findings for complement coercion; recall the discussion of the examples in (11) and (12).

'a nimble door' can mean that the door is opened quickly, or, nimbly. However, this does not weaken the main point here, namely, that fine-grained differences play a crucial role in adequately capturing coercive potentials. For ease of presentation, though, we will neglect these additional restrictions in this paper.

⁷ The interpretation via a smoking event is ruled out for independent reasons, namely, by the fact that smoking events cannot unfold in a fast and skillful way (in other words, *#flink rauchen* 'nimble smoke' is itself bad). However, one can, for instance, roll a cigarette in a nimble way. Nevertheless, the given example does not allow for this alternative transitive specification either.

The observations indicate that lexical items determine whether coercion is possible and which form it can take. Coercion is thus rooted in lexical semantics. It is worthwhile to relate this conclusion to the fact that coercion is also highly sensitive to the context; see the introduction and Section 2.1. There we have emphasized that global contextual information can override local default specifications of interpolated eventualities. The same is true for *flink*; see (27). In the particular context, the attribute clearly relates to the way Ben moves on the playing field. The head noun's type BAKER merely identifies Ben by recalling one of his prominent general properties. However, his particular way of baking is completely irrelevant here.

- (27) a. Context: the villagers knew Ben as their calm and inconspicuous baker, not knowing that he was also a very good soccer player. This changed as they watched the match against the neighboring village.
- b. Sie beobachteten den flinken Bäcker zunächst mit
they observed the nimble baker at first with
Erstaunen, dann mit Bewunderung.
astonishment then with admiration
'They at first observed the nimble baker with astonishment, then with admiration.'

Obviously, however, this alternative interpretation does not go beyond the range of interpretations otherwise supported by *flink*'s coercive potential. By contrast, contextual information cannot override restrictions that lexical items bind to potential coercions. Therefore, the coercion-based examples in (28) and (29) are infelicitous, despite the fact that the given contexts prompt adequate repairs.

- (28) Paul hat binnen weniger Minuten behände eine Suppe zubereitet.
Paul has within few minutes agilely a soup prepared
Die {#flinke / flink zubereitete} Mahlzeit schmeckte allen.
the {nimble / nimbly prepared} meal tasted everyone
'Paul has agilely prepared a soup within a few minutes. Everyone liked the {nimble / nimbly prepared} meal.'

Coercion by modification

- (29) Paul hat gesagt, dass wir uns so bald wie möglich zu einer
Paul has said that we so soon as possible for a
ausführlichen Diskussion treffen sollen. Das heißt, wir brauchen
extensive discussion meet should that is we need
ein {#flinkes / flink organisiertes} Meeting.
a {nimble / nimbly organized} meeting
'Paul said that we should get together for an extensive discussion as
soon as possible. That is, we need a {nimble / nimbly organized} meet-
ing.'

There is thus no contradiction between coercion being sensitive to both semantics and pragmatics. The key message is that contextual information can tighten existing lexical requirements, but it cannot add grammatically in-existent options, or ease lexically given restrictions: the lexicon has priority over the context.

Finally, we would like to briefly consider another cognate adjective, namely, *rasch* 'rapid'. Interestingly, *rasch* involves (partly) opposite restrictions to those for *flink*. For instance, it supports the interpolation of a preparation or eating event if combined with a food-denoting noun, as in (30), while it is odd in combination with nouns that suggest a reading involving self-propelled motion, as in (31). Correspondingly, *rasch* enforces the food reading of ambiguous head nouns such as *trout* in (32).

- (30) eine rasche Pilzsuppe
a rapid mushroom soup
'a mushroom soup {prepared / eaten} rapidly'
- (31) a. #eine rasche Maus
a rapid mouse
b. #ein rascher Koch
a rapid cook
- (32) eine rasche Forelle
a rapid trout
= 'a trout prepared rapidly'
≠ 'a trout swimming rapidly'

Notably, the constraints for the repair are again not fully identical to the case where *rasch* targets an explicitly given eventuality. The example in (33) shows

that *rasch* can be combined with an explicit unary predication such as *grow*. Nevertheless, a corresponding interpolation is not feasible in (31a).

- (33) eine rasch wachsende Maus
a rapidly growing mouse

We conclude that *rasch* does not relate to the internal dynamics of events (such as the manner in which an event participant is moving), but necessarily predicates high velocity of eventualities as wholes.

In sum, the combinatorics of *flink* and *rasch* with nominal targets obeys constraints irrelevant for the kindred adjective *schnell*. In particular, coercion by *flink* only supports the interpolation of a movement by the explicit target entity, which is excluded by *rasch*. Most notably, for both modifiers the range of coercion-based interpretations does not exploit the full range of interpretations available for modification without coercion. The findings show that coercion by modification is sensitive to fine-grained lexical knowledge and thus rooted in the linguistic system.

3 Coercion by modification in a type-logical approach

3.1 Introduction to Type Composition Logic

The present exemplification of coercion by modification builds on Asher's (2011) Type Composition Logic. In this approach, semantic terms provide both ordinary intensions and detailed typing information. The typing information includes type presuppositions that correspond to the selectional restrictions of predicates and must be met by the terms' arguments during composition. The presuppositions are encoded within contextual parameters π that are part of the compositional machinery. This multi-layered approach to composition is motivated by the following more general considerations; see Asher 2011 for an elaborate discussion.

A system that complements ordinary intensional semantics with rich typing information reconciles two perspectives on the composition of meaning. Similarly to semantic frameworks that build on a very limited range of types such as traditional Montague grammar, the syntax-semantics interface manages with only a few types such as entities, truth-values, and worlds. This is also the level of interpretation where standard set-theoretic operations, such as the quantification over entities in particular worlds, can apply. However, the integration of richer types within separate parameters π renders the

composition sensitive to conceptual knowledge as well and thereby specifies the interface to pragmatics. The type-logical representation for the modifying locative *on the kitchen table* in (34) serves as a simplified illustration.

$$(34) \quad \llbracket \text{on the kitchen table} \rrbracket = \lambda P \lambda x \lambda \pi. \\ \text{on}(x, \iota k[\text{kitchen table}(k)], \pi * \text{ARG}_1^P: \text{TY}^{ps}(P) * \text{ARG}_1^{on}: \text{CONCRETE}) \\ \wedge P(x)(\pi)$$

On the one hand, the locative is (except for the inclusion of arguments for context parameters) a standard modifier of type $\langle\langle e, \langle \pi, t \rangle \rangle, \langle e, \langle \pi, t \rangle \rangle\rangle$, that is, a function from predicates to predicates without any further type-restrictions (the λ -bound variables P and x are *not* assigned to specific subtypes such as (predicates of) individuals or events at this point). This captures the intuition that the modified constituents in (35) are all fine in terms of their composition at the syntax-semantics interface.

- (35) a. cigarette on the kitchen table
 b. dance on the kitchen table
 c. #fact on the kitchen table

On the other hand, the parameter π attached to the locative predicate within (34) is amended by two more specific type presuppositions ($*$ symbolizes the amendment of parameters by presuppositions): (i) π includes the type presupposition that the modification target will bring in, namely, $\text{TYPE}^{ps}(P)$ (with *ps* mnemonic for presupposition). Hence, the target's presupposition percolates (that is, is passed on) to the modifier and is thereby made locally relevant to the presupposition site of the locative predicate. (ii) π includes that *on* presupposes as its first argument a concrete entity that can be localized in space (= CONCRETE). Given that both *cigarette* and *dance* presuppose concrete entities as their arguments — a physical artifact and an eventuality, respectively — a simple meet operation supports the *justification* of these specific presuppositions in (35a) and (35b). By contrast, given that *fact* presupposes an abstract entity, the justification fails in (35c); this captures the intuition that (35c) is conceptually odd. We use the term “justification” here because Type Composition Logic is rooted in proof-theoretic semantics. A variable x justifies a type TYPE just in case that the system of type-related

rules proves that x is of type `TYPE`; in other words, x fulfills the conditions that our conceptual knowledge associates with the type `TYPE`.⁸

The technical implementation of the derivation and the subsequent justification can be sketched as follows. Based on the entry in (36) for the predicate *cigarette*, standard composition yields (37) for (35a). By virtue of being the first argument of *on* and the first argument of *cigarette*, the variable x should justify both a physical artifact (= `P-ART`) and a concrete entity (= `CONCRETE`). As these demands can be fulfilled by the same entity, so-called Simple Type Accommodation is licensed (see Asher 2011: p. 117 for the general rule); this yields the simplified representation in (38).

$$(36) \quad \llbracket \text{cigarette} \rrbracket = \lambda u \lambda \pi''. \text{cigarette}(u, \pi'' * \text{ARG}_1^{\text{cigarette}}: \text{P-ART})$$

$$(37) \quad \llbracket \text{cigarette on the kitchen table} \rrbracket \\ = \quad [\lambda P \lambda x \lambda \pi. \text{on}(x, \iota k[\text{kitchen table}(k)], \pi * \text{ARG}_1^P: \text{TY}^{ps}(P) * \\ \text{ARG}_1^{\text{on}}: \text{CONCRETE}) \wedge P(x)(\pi)] \\ (\lambda u \lambda \pi''. \text{cigarette}(u, \pi'' * \text{ARG}_1^{\text{cigarette}}: \text{P-ART})) \\ = \quad \lambda x \lambda \pi. \text{on}(x, \iota k[\text{kitchen table}(k)], \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART} \\ * \text{ARG}_1^{\text{on}}: \text{CONCRETE}) \wedge \text{cigarette}(x, \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART})$$

$$(38) \quad \llbracket \text{cigarette on the kitchen table} \rrbracket \\ = \quad \lambda x: \text{P-ART} \lambda \pi. \text{on}(x, \iota k[\text{kitchen table}(k)], \pi) \wedge \text{cigarette}(x, \pi)$$

The composition for (35c) is fully analogous; see the result in (40), based on the entry for *fact* in (39). However, since x cannot be both an abstract and a concrete entity (`CONCRETE` \sqcap `ABSTRACT` = \perp), Simple Type Accommodation fails.

⁸ An anonymous reviewer asks why we do not associate presuppositions with λ -bound variables directly (that is, do not rely on lexical representations such as $\lambda x: \text{TYPE}$) and thereby dispense with their encoding via π . There are basically two reasons: first, if we did, standard λ -conversion would be impossible for any compositional situation where presupposed type and argument type do not match; that is, the composition at the syntax-semantics interface would break down immediately. This, however, does not comply with the intuition about type-related conceptual mismatches such as *fact on the table*. These mismatches do not relate to the syntax-semantics interface, but to the justification of types at the semantics-pragmatics interface. The attribution of fine-grained typing presuppositions to a separate contextual parameter π makes this distinction transparent. Second, the contextual parameter π is an independent part of the compositional machinery; therefore, it can be used for systematically manipulating the percolation of presuppositions. This will become particularly important for the locality effects observed for coercion; see the further discussion for details.

$$(39) \quad \llbracket \text{fact} \rrbracket = \lambda u \lambda \pi'' . \text{fact}(u, \pi'' * \text{ARG}_1^{\text{fact}}: \text{ABSTRACT})$$

$$(40) \quad \llbracket \text{fact on the kitchen table} \rrbracket \\ = \lambda x \lambda \pi . \text{on}(x, \iota k[\text{kitchen table}(k)], \pi * \text{ARG}_1^{\text{fact}}: \text{ABSTRACT} * \\ \text{ARG}_1^{\text{on}}: \text{CONCRETE}) \wedge \text{fact}(x, \pi * \text{ARG}_1^{\text{fact}}: \text{ABSTRACT})$$

We will briefly highlight three aspects of this set-up. First, there is no need to distinguish between a locative modifier for physical objects and one for eventualities. The interpretation of both (35a) and (35b) builds on the uniform entry as defined in (34). The effect that the modifier locates a physical object in (35a) and an eventuality in (35b) only results from the meet operation at the level of type justification.⁹

Second, the approach integrates so-called preferred types as one further kind of type. Preferred types are the most fine-grained types offered by predicates; for instance, the predicate *cigarette* introduces the preferred type CIGARETTE. The reason for this additional distinction is the following. On the one hand, presuppositions are generally not sensitive to preferred types. So, for instance, in a situation with a cigar lying on a table, the utterance *There is a cigarette lying on the table* does *not* amount to a presuppositional failure, but to a wrong assertion. Therefore, the predicate *cigarette* should not project its fine-grained proffered type CIGARETTE as its presupposition, but something more coarse-grained. More specifically, the presuppositional type PHYSICAL ARTIFACT would be compatible with the type CIGAR, which licenses a smooth composition for the given utterance in the table scenario. On the other hand, our conceptual knowledge clearly distinguishes between cigarettes and cigars; for instance, we usually consider cigars bigger, more precious, a potential symbol for a certain social status, etc. Therefore, preferred types can play a role in the specification of mediating material in the case of coercion. The type-logical analysis of coercion in Section 3.2 will show how preferred types are factored into the specification process.

Third, the given derivations show that the contextual parameter π is part of the compositional machinery. It is thus a grammatical means for manipu-

⁹ Notably, systems that do not distinguish between sparse types at the syntax-semantics interface and richer subtypes at the semantics-pragmatics interface are confronted with a challenge here. For instance, in order to relate the locative *on the kitchen table* to an event predicate such as *dance*, one could treat the locative as a modifier of type $\langle\langle v, t \rangle, \langle v, t \rangle\rangle$ (with v for events). However, this locative would be incompatible with predicates of physical objects, which makes a separate entry necessary. As the locative does not seem to be ambiguous, such a proliferation of entries is clearly unattractive.

lating the site where a certain presupposition must be fulfilled. Specifically, given the assumption that the target’s presupposition percolate to the contextual parameter of the modifying predicate, the presupposition justification applies to the local predication of the modifier. As the attentive reader might already have guessed, this will be crucial for capturing the observed locality effects of coercion; see the following Section 3.2 for the concrete implementation.¹⁰

3.2 The type-logical analysis of event coercion by adnominal modifiers

3.2.1 Accounting for the foundational observations

If types do not match, the composition has generally two options in Type Composition Logic: it can simply crash, yielding a pragmatically infelicitous expression; this is the case for the example in (35c) above. Alternatively, so-called polymorphic types can allow for a conceptual repair, that is, for the interpolation of additional material that mediates between the conflicting types. However, both the existence of polymorphic types and their particular shape are determined by individual lexical items; therefore, the repair option is not a purely pragmatic issue, but is rooted in the linguistic system. The following exemplification on the basis of event coercion by adnominal modifiers will bring out the benefits of such a dynamic conception of lexical semantics and the corresponding integrated perspective on the interface between lexical semantics and pragmatics.

Let us start with the simple case in point in (3), repeated in (41).

- (41) Paul rauchte eine schnelle Zigarette.
Paul smoked a quick cigarette

In order to model the interpolation of an adequate eventuality, we propose the following entry for *schnell*:

- (42) $\llbracket \text{schnell} \rrbracket = \lambda P \lambda x \lambda \pi . \text{schnell}(x, \pi * \text{ARG}_1^P : \text{TY}^{ps}(P) * \text{ARG}_1^{\text{schnell}} : \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{TY}^+(P)\})) \wedge P(x)(\pi)$

This entry has the same structure as the entry for the modifying locative in (34). The context parameter for *schnell* inherits the presupposition of the

¹⁰ While Asher (2011) also assumes that the target’s presupposition percolates to the modifier, his particular compositional implementation differs in one important respect from our proposal; see Section 4 for the corresponding discussion.

target (= $\text{TY}^{ps}(P)$) and brings in its own presupposition; specifically, *schnell* presupposes as its first argument an eventuality (= EVTY). However, there is one crucial difference, namely, the addition of a polymorphic eventive type $\epsilon(\{\llbracket \alpha_1, \dots \rrbracket \text{TY}^+(P)\})$ and, thus, of a lexical anchor for coercion. More generally, a type presupposition such as ‘ $\text{TYPE} - \tau$ ’ says that the type justification can proceed in two ways: if the compositionally given target provides the type TYPE , justification proceeds via this type directly. If, by contrast, the target does not provide the appropriate type, justification can unfold via the alternative polymorphic type τ . Notably, since this is a conditional statement, the justification via the alternative route is only licensed by a type conflict.¹¹ The defining trait of polymorphic types is that they relate to other types. For the given particular polymorphic type ϵ , this feature is used in the following crucial ways. For one, ϵ relates to the compositional target by assigning the target’s fine-grained proffered type $\text{TY}^+(P)$ to one of its argument types (+ is mnemonic for proffered types). This ensures that any mediating eventuality must relate to the compositionally given target and its most specific typing information. In addition, $\llbracket \alpha_1, \dots \rrbracket$ indicates that ϵ may also involve further argument types besides the compositionally given one ($\llbracket \]$ is mnemonic for optionality). At the same time, the curly brackets indicate that the ranking among ϵ ’s argument types is underspecified. As a crucial consequence, this leaves open which thematic role the compositional target eventually receives within the eventuality that will be introduced based on the polymorphic eventive type. Notably, the entry proposed in Asher 2011: (8.44) for *quick* in English does not assume any further argument types for ϵ besides the one given by the compositional target. In fact, Asher does not discuss any complications that result from assuming or not assuming such further argument types. However, the comparison of *schnell*’s coercive potential with that of other speed adjectives such as *flink* ‘nimble’ or *rasch* ‘rapid’ in Section 2.2 clearly suggests such a more detailed perspective; see below for the formal consequences.

Standard composition yields the derivation in (43) for the modified NP.

$$\begin{aligned}
 (43) \quad & \llbracket \text{schnelle Zigarette} \rrbracket \\
 & = \llbracket \lambda P \lambda x \lambda \pi . \text{schnell}(x, \pi * \text{ARG}_1^P: \text{TY}^{ps}(P) \\
 & \quad * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\llbracket \alpha_1, \dots \rrbracket \text{TY}^+(P)\})) \wedge P(x)(\pi) \rrbracket \\
 & \quad (\lambda u \lambda \pi'' . \text{cigarette}(u, \pi'' * \text{ARG}_1^{\text{cigarette}}: \text{P-ART}))
 \end{aligned}$$

¹¹ The dash ‘-’ thus does not symbolize a simple disjunction of options, but a specific conditional relationship.

$$\begin{aligned}
&= \lambda x \lambda \pi . \text{schnell}(x, \pi * \text{ARG}_1^{\text{cigarette}} : \text{P-ART} \\
&\quad * \text{ARG}_1^{\text{schnell}} : \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})) \\
&\quad \wedge \text{cigarette}(x, \pi * \text{ARG}_1^{\text{cigarette}} : \text{P-ART})
\end{aligned}$$

As a result, the NP denotes the set of x so that x should justify both a physical artifact and an eventuality. Clearly, these demands cannot be fulfilled by the same entity. In other words, so-called Simple Type Accommodation fails since P-ART and EVTY have no common meet ($\text{P-ART} \sqcap \text{EVTY} = \perp$). However, the polymorphic type $\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})$ licenses so-called ‘Accommodation via generalized polymorphic types’, which is rendered in (44) (adapted from Asher 2011: p. 225).

$$\begin{aligned}
(44) \quad &\psi(v, \pi) \\
&\pi \text{ carries } \text{ARG}_j^Q : A * \text{ARG}_i^P : D - \delta(\{\ulcorner \alpha_1, \dots \urcorner \text{SUBTYPE}(A)\}) \\
&v \text{ is both the } j\text{-th argument of } Q \text{ and the } i\text{-th argument of } P \\
&A \sqcap D = \perp \\
&\hline
&\mathcal{D}(\lambda w \lambda \pi' \psi(w, \pi'))(v)(\pi)
\end{aligned}$$

It says: if a contextual parameter π of a term ψ involves conflicting types for a variable v , but allows for their mediation via a polymorphic type δ , the problematic term ψ can be accommodated appropriately via a functor \mathcal{D} . For the case at hand, the accommodation yields the following derivational steps.

The problematic term for *schnell* undergoes abstraction, as in (45). Subsequently, the abstracted part is taken by an appropriate functor \mathcal{D} , as in (46). Crucially, \mathcal{D} introduces existential quantification over a variable of the polymorphic eventive type while freeing the compositionally active variable from corresponding eventive typing requirements. The introduction of this new eventive variable is mirrored on the ordinary intensional level by the introduction of a corresponding predicate variable ϕ . Notably, while the composition determines that it must be a predicate of events relating to cigarettes, its properties in detail (type of event, existential quantification over further arguments besides cigarettes and their type) are left underspecified.

$$\begin{aligned}
(45) \quad &\text{schnell}(x, \pi * \text{ARG}_1^{\text{cigarette}} : \text{P-ART} * \\
&\quad \text{ARG}_1^{\text{schnell}} : \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})) \\
&= [\lambda w \lambda \pi' . \text{schnell}(w, \pi')](x)(\pi * \text{ARG}_1^{\text{cigarette}} : \text{P-ART} * \\
&\quad \text{ARG}_1^{\text{schnell}} : \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}))
\end{aligned}$$

Coercion by modification

$$\begin{aligned}
(46) \quad & [\lambda P \lambda v \lambda \pi'' \exists e: \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}) \ulcorner \exists v_1: \dots \urcorner [P(e)(\pi'') \wedge \\
& \phi_{\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})}(e, \{\ulcorner v_1, \dots \urcorner v\}, \pi'')]] (\lambda w \lambda \pi' . \text{schnell}(w, \pi')) \\
& = \lambda v \lambda \pi'' \exists e: \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}) \ulcorner \exists v_1: \dots \urcorner \\
& \quad [\text{schnell}(e, \pi'') \wedge \phi_{\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})}(e, \{\ulcorner v_1, \dots \urcorner v\}, \pi'')]]
\end{aligned}$$

The transformed result is reinserted into (45), as in (47), which yields the revised logical representation in (48) for the full NP.

$$\begin{aligned}
(47) \quad & [\lambda v \lambda \pi'' \exists e: \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}) \ulcorner \exists v_1: \dots \urcorner \\
& \quad [\text{schnell}(e, \pi'') \wedge \phi_{\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})}(e, \{\ulcorner v_1, \dots \urcorner v\}, \pi'')]] (x) \\
& \quad (\pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART} * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})) \\
& = \exists e: \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}) \ulcorner \exists v_1: \dots \urcorner [\text{schnell}(e, \pi * \text{ARG}_1^{\text{cigarette}}: \\
& \quad \text{P-ART} * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})) \\
& \quad \wedge \phi_{\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})}(e, \{\ulcorner v_1, \dots \urcorner x\}, \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART} \\
& \quad * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}))]
\end{aligned}$$

$$\begin{aligned}
(48) \quad & \llbracket \text{schnelle Zigarette} \rrbracket \\
& = \lambda x \lambda \pi \exists e: \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}) \ulcorner \exists v_1: \dots \urcorner [\text{schnell}(e, \pi * \\
& \quad \text{ARG}_1^{\text{cigarette}}: \text{P-ART} * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})) \\
& \quad \wedge \phi_{\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})}(e, \{\ulcorner v_1, \dots \urcorner x\}, \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART} \\
& \quad * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})) \\
& \quad \wedge \text{cigarette}(x, \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART})]
\end{aligned}$$

Since $\text{ARG}_1^{\text{cigarette}}$ ($= x$) and $\text{ARG}_1^{\text{schnell}}$ ($= e$) now differ, justification can succeed; see the simplified result in (49). In prose: *schnelle Zigarette* denotes the set of physical artifacts (P-ART) x such that there is an underspecified event e that takes x as its argument and, potentially, further arguments v_i .

$$\begin{aligned}
(49) \quad & \llbracket \text{schnelle Zigarette} \rrbracket \\
& = \lambda x: \text{P-ART} \lambda \pi \exists e: \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\}) \ulcorner \exists v_1: \dots \urcorner [\text{schnell}(e, \pi) \\
& \quad \wedge \phi_{\epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{CIGARETTE}\})}(e, \{\ulcorner v_1, \dots \urcorner x\}, \pi) \wedge \text{cigarette}(x, \pi)]
\end{aligned}$$

What are the key merits of the pursued approach? First, the lexical entries straightforwardly reflect common-sense intuitions about the relevant predicates. The context parameter for *schnell* relates its first argument to eventualities and thereby identifies the predicate as an event-sensitive modifier; the context parameter for *Zigarette* relates its first argument to physical artifacts and thereby identifies the predicate as one that ranges over physical artifacts. Moreover, this information is kept fully intact throughout the derivation. In

particular, the modifier's entry does not provide by itself a prophylactical relation variable that mediates between modifier and modifiee. In lieu thereof, the polymorphic type merely encodes a dynamic potential for interpolating mediating material and for thereby resolving a detected type conflict. Thus, the approach makes a natural distinction between examples where modifier and modifiee can merge directly and examples that enforce adaptations, such as the one above. For instance, the example in (50) with an eventive target would not need any of the repair steps spelled out in (45)–(48). Analogously to the locative modifiers discussed in Section 3.1, the compositional result in (51) can be simplified directly by Simple Type Accommodation; see (52). (For ease of presentation, we omit the agent argument here.)

(50) schnelles Rauchen einer Zigarette
quick smoking of a cigarette

(51) \llbracket schnelles Rauchen einer Zigarette \rrbracket
 $=$ $[\lambda P \lambda x \lambda \pi. \text{schnell}(x, \pi * \text{ARG}_1^P: \text{TY}^{ps}(P) * \text{ARG}_1^{\text{schnell}}: \text{EVTY}$
 $- \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{TY}^+(P)\}) \wedge P(x)(\pi)](\lambda u \lambda \pi'' \exists z: \text{P-ART}$
 $[\text{smoking}(u, z, \pi'' * \text{ARG}_1^{\text{smoking}}: \text{EVTY}) \wedge \text{cigarette}(z, \pi'')]$
 $=$ $\lambda x \lambda \pi \exists z: \text{P-ART}[\text{schnell}(x, \pi * \text{ARG}_1^{\text{smoking}}: \text{EVTY}$
 $* \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{SMOKING}\})$
 $\wedge \text{smoking}(x, z, \pi * \text{ARG}_1^{\text{smoking}}: \text{EVTY}) \wedge \text{cigarette}(z, \pi)]$

(52) \llbracket schnelles Rauchen einer Zigarette \rrbracket
 $=$ $\lambda x: \text{EVTY} \lambda \pi \exists z: \text{P-ART}[\text{schnell}(x, \pi) \wedge \text{smoking}(x, z, \pi)$
 $\wedge \text{cigarette}(z, \pi)]$

The distinction between derivations that are based on repairs and those that are not based on them is the crucial difference from an underspecification account as proposed by Dölling (2003, 2005, 2014) and summarized in the introduction.

Second, the conflict resolution proceeds via the modifying predicate because the context parameter of the modifier hosts the relevant conflict. This predicts that the resolution will be locally operative, which contrasts with the perspective laid out in Pustejovsky 1995a, 2011. In other words, the typing requirements that are associated with the compositionally active argument of the complex NP are independent of the resolution and solely sensitive to the presuppositions coming along with the nominal head. This captures the locality effects surveyed in Section 2.1; recall, for instance, the contrast in

(53) (= (6b) and (7)), which shows that the modification via *schnell* does not coerce the NP into denoting an eventuality.

- (53) a. #Pauls (schnelles) Zubereiten der Pilzsuppe stürzte zu
 Paul's quick preparation of the mushroom soup fell to
 Boden.
 ground
- b. Pauls schnelle Pilzsuppe stürzte zu Boden.
 Paul's quick mushroom soup fell to ground

Crucially, these locality effects indicate that the conceptual repair must be conceived of as a rule-based interaction between typing information and ordinary intensional semantics. This is the reason why the contextual parameters are part of the compositional machinery and, thus, a structure-sensitive means for adequately manipulating the percolation of typing information.

Third, the resulting logical representation does not rigidly specify the type of the mediating eventuality. However, by virtue of its typing information, the specification can take advantage of various conceptual knowledge resources, in particular, of so-called default identities that are based on the locally given semantic material. Following Asher 2011, we couch these defaults in terms of defeasible weak conditionals. However, Asher's formulations of defaults do not pay much attention to the exact shape and arity of the relevant polymorphic types. In order to capture fine-grained differences among coercive potentials, we, by contrast, advance an account that builds upon such details. Consequently, our proposed defaults carefully include information about a polymorphic type's particular form. For the case at hand, defaults such as in (54) are plausible (> stands for defeasible weak conditional relations).

- (54) a. $(\vec{a} \sqsubseteq \text{ENTITY} \wedge a^m \sqsubseteq \text{CIGARETTE}) > \epsilon(\{\vec{a}, a^m\}) = \text{SMOKE}(a^1, a^m)$
 b. $(\vec{a} \sqsubseteq \text{ENTITY} \wedge a^m \sqsubseteq \text{BEVERAGE}) > \epsilon(\{\vec{a}, a^m\}) = \text{DRINK}(a^1, a^m)$
 c. ...
 (\vec{a} : series of types a^1, a^2, \dots ; a^m : type of variable rank m)

According to (54a), the most plausible eventive type relating some entity type(s) to the type CIGARETTE is SMOKE. This yields the conceptual structure (that is, the conceptually enriched semantic structure) in (55) for (49).

- (55) \llbracket schnelle Zigarette \rrbracket
 = $\lambda x: \text{P-ART} \lambda \pi \exists e: \text{SMOKE}(\text{ENTITY}, \text{CIGARETTE}) \exists v: \text{ENTITY}$
 $[\text{schnell}(e, \pi) \wedge \text{smoke}(e, v, x, \pi) \wedge \text{cigarette}(x, \pi)]$

Accordingly, the NP picks out the set of cigarettes that are smoked quickly. Notably, this specification option builds upon the locally given NP-internal typing information alone. This is in keeping with the intuition that potential specifications can already be grasped at the NP level; recall the discussion in Section 2.1. As desired, the proposal thus keeps compositional and noncompositional meaning components apart while allowing them to directly interact with each other. Recall furthermore that broader contextual information can override local inferences. The type-logical approach is well equipped for factoring this context-sensitivity into the analysis as well. For one, the default identities are defined as being nonmonotonic and are thus by themselves contingent upon pragmatics. Furthermore, as the type justification depends on whether particular objects in particular contexts can justify presupposed types or not, the relevant typing information is not determined by invariant lexical knowledge and conceptual defaults alone, but is ultimately subject to the context. For concreteness, we will briefly tackle the example in (56) (= (10)); its specific feature is that it suggests the interpolation of a mediating eventuality although the explicit target already provides an eventuality.

- (56) Paul hat gesagt, dass wir uns so bald wie möglich zu einer
 Paul has said that we so soon as possible for a
 ausführlichen Diskussion treffen sollen. Das heißt, wir brauchen
 extensive discussion meet should that is we need
 ein schnelles Meeting.
 a quick meeting
 ‘Paul said that we should get together for an extensive discussion as
 soon as possible. That is, we need a quick meeting.’

Our type-logical approach captures this in the following way. The context suggests that contextually relevant meetings cannot be quick; compare the first sentence in (56) according to which Paul has called for a joint extensive discussion. This licenses a corresponding contextual adaption of the presuppositions of the modifier *schnell*. Specifically, its presupposed domain is rendered smaller by excluding meetings; see the adapted representation of *schnell* in (57) (the backslash symbolizes exclusion). Notably, this adaption does not affect the lexical semantics of *schnell*; in lieu thereof, the adaption

hinges on its use in a specific contextual situation and thus on the specific, potentially idiosyncratic assumptions that are made for meetings in this situation.

$$(57) \quad \llbracket \text{schnell}_{\text{contextually adapted}} \rrbracket = \lambda P \lambda x \lambda \pi. \text{schnell}(x, \pi * \text{ARG}_1^P: \text{TY}^{ps}(P) * \text{ARG}_1^{\text{schnell}}: \text{EVTY} \setminus \text{MEETING} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner\} \text{TY}^+(P))) \wedge P(x)(\pi)$$

As a consequence, the interpretation of the modified NP *schnelles Meeting* in (56) involves a contextually induced type conflict. As desired, this excludes Simple Type Accommodation and licenses the interpolation of an additional mediating eventuality; a plausible candidate would be an eventuality of type ORGANIZE.

In sum, the proposed type-logical analysis complies with all foundational observations made for coercion by modification: the intuition that lexical items bear invariable conceptual content, locality effects, and the sensitivity of coercion to both default knowledge and contextual information.

3.2.2 Accounting for the lexeme-specific effects of interpretation

We have emphasized that coercion is rooted in the lexical system. This key feature is the reason why the proposal can easily cope with lexeme-specific effects of interpretation. In order to capture the specific traits of *flink* ‘nimble’, we propose the entry in (58).

$$(58) \quad \llbracket \text{flink} \rrbracket \\ = \lambda P \lambda x \lambda \pi. \text{flink}(x, \pi * \text{ARG}_1^P: \text{PS-TYPE}(P) * \text{ARG}_1^{\text{flink}}: \text{EVTY}_{\text{sfm}} - \epsilon_{\text{sfm}}(\text{TY}^+(P) \ulcorner \alpha_2, \dots \urcorner)) \wedge P(x)(\pi)$$

The predicate’s presuppositions shape *flink*’s combinatorial options as follows. The local context parameter says that the modifier’s target must justify an eventuality that can involve small fast movements, that is, be of type EVTY_{sfm} . On the one hand, this requirement is rather loose, which corresponds to the observation that *flink* can combine with eventualities of different types. On the other hand, the constitutive relation to small fast movements excludes the combination with eventualities that cannot build on the requisite path structure. If no such eventuality is given, the justification can proceed via the polymorphic type $\epsilon_{\text{sfm}}(\text{TY}^+(P) \ulcorner \alpha_2, \dots \urcorner)$. This provides the licensing lexical anchor for resolving a given type conflict. However, this option has further constraints: the resulting eventuality must not only poten-

tially involve small fast movements, but also assign the target's fine-grained type $\text{TY}^+(P)$ to its highest ranked thematic argument. (The brackets $\lceil \rceil$ indicate that further types α_2 , etc., are optional.) The following sample derivations will illustrate the entry's benefits; we will pay particular attention to the question of how the constraints comply with the interpretational options and limitations as observed for conflict-based cases.

Based on (58), the example in (21a) receives the representation in (59).

$$(59) \quad \llbracket \text{flinke Forelle} \rrbracket \\ = \lambda x \lambda \pi . \text{flink}(x, \pi * \text{ARG}_1^{\text{trout}}: \text{ANIMAL} \\ * \text{ARG}_1^{\text{flink}}: \text{EVTY}_{\text{sfm}} - \epsilon_{\text{sfm}}(\text{TROUT}_{\lceil \alpha_2, \dots \rceil})) \\ \wedge \text{trout}(x, \pi * \text{ARG}_1^{\text{trout}}: \text{ANIMAL})$$

As Simple Type Accommodation fails (cf. $\text{ANIMAL} \sqcap \text{EVTY}_{\text{sfm}} = \perp$), the justification can proceed via the polymorphic type, which yields the revised logical representation in (60). (The procedure is fully analogous to the one exemplified for *schnell* above.)

$$(60) \quad \llbracket \text{flinke Forelle} \rrbracket \\ = \lambda x: \text{ANIMAL} \lambda \pi \exists e: \epsilon_{\text{sfm}}(\text{TROUT}_{\lceil \alpha_2, \dots \rceil})_{\lceil \exists v_2: \dots \rceil} \\ [\text{flink}(e, \pi) \wedge \phi_{\epsilon_{\text{sfm}}(\text{TROUT}_{\lceil \alpha_2, \dots \rceil})}(e, x_{\lceil v_2, \dots \rceil}, \pi) \wedge \text{trout}(x, \pi)]$$

For fishes such as trout, the default identity in (61) is plausible, which gives us the most plausible conceptual interpretation, namely, that the NP denotes the set of trouts that swim in such a way that it involves small fast movements.

$$(61) \quad (a^1 \sqsubseteq \text{FISH}_{\lceil \bar{a} \sqsubseteq \text{ENTITY} \rceil}) > \epsilon_{\text{sfm}}(a^1_{\lceil \bar{a} \rceil}) = \text{SWIM}_{\text{sfm}}(a^1)$$

The very same reasoning yields the revised logical representation in (62) for (22a). The difference is merely that the local type information gives rise to a different default identity; compare (63), which says that, most probably, the interpolated eventuality is a cooking.

$$(62) \quad \llbracket \text{flinker Koch} \rrbracket \\ = \lambda x: \text{HUMAN} \lambda \pi \exists e: \epsilon_{\text{sfm}}(\text{COOK}_{\lceil \alpha_2, \dots \rceil})_{\lceil \exists v_2: \dots \rceil} \\ [\text{flink}(e, \pi) \wedge \phi_{\epsilon_{\text{sfm}}(\text{COOK}_{\lceil \alpha_2, \dots \rceil})}(e, x_{\lceil v_2, \dots \rceil}, \pi) \wedge \text{cook}(x, \pi)]$$

$$(63) \quad (a^1 \sqsubseteq \text{COOK}_{\lceil \bar{a} \sqsubseteq \text{ENTITY} \rceil}) > \epsilon_{\text{sfm}}(a^1_{\lceil \bar{a} \rceil}) = \text{COOK}_{\text{sfm}}(a^1, a^2)$$

Clearly, this specification is supported by the explicit verbal base of the agent-denoting head noun. However, according to the present account, this

information is not accessible in terms of semantic composition proper, but in terms of defeasible conceptual knowledge. This complies with both standard compositional rules — the modifier should not be able to directly apply to word-internal components — and the observation that this specification is not obligatory; recall example (64) (= (27)).¹²

- (64) a. Context: the villagers knew Ben as their calm and inconspicuous baker, not knowing that he was also a very good soccer player. This changed as they watched the match against the neighboring village.
 b. Sie beobachteten den flinken Bäcker zunächst mit
 they observed the nimble baker at first with
 Erstaunen, dann mit Bewunderung.
 astonishment then with admiration
 ‘They at first observed the nimble baker with astonishment, then with admiration.’

How does the proposal account for the infelicitous cases? For (24a), the repair yields the revised logical representation in (65).

- (65) $\llbracket \text{flinke Pilzsuppe} \rrbracket$
 $= \lambda x: \text{FOOD} \lambda \pi \exists e: \epsilon_{sfm}(\text{MUSHROOM SOUP}_{[\alpha_2, \dots]})_{[\exists v_2: \dots]}$
 $\llbracket \text{flink}(e, \pi) \wedge \phi_{\epsilon_{sfm}(\text{MUSHROOM SOUP}_{[\alpha_2, \dots]})}(e, x_{[\nu_2, \dots]}, \pi)$
 $\wedge \text{mushroom soup}(x, \pi) \rrbracket$

However, there is no good candidate for identifying the relevant eventuality here, simply because mushroom soups usually do not move. In other words, according to conceptual knowledge, we cannot make sense of a default identity such as the one in (66).

- (66) $(a^1 \sqsubseteq \text{FOOD}_{[\wedge \vec{a} \sqsubseteq \text{ENTITY}]}) > \epsilon_{sfm}(a^1_{[\vec{a}]}) = ?_{sfm}(a^1, a^2)$

¹² It is a well-known challenge for compositionality that word-external modifiers can sometimes relate to word-internal components such as event arguments, as in (62) under its most natural interpretation. A famous solution builds on the assumption that the structural input is more complex than predicted by the given surface structure; see, for instance, Larson 1998 and Winter & Zwarts 2013 for discussion. An alternative view builds on the assumption that the structure-semantics interface as such gives rise to flexible combinatorics; see Egg 2005, 2006 for discussion. The present proposal is arguably simpler. However, a thorough comparison of the various approaches is beyond the scope of this paper; we will therefore leave it to another occasion.

This reasoning is not contradicted by the fact that the mediation by a preparation event would be conceptually feasible; recall (26a) and, analogously, (67).

- (67) die flink zubereitete Pilzsuppe
the nimbly prepared mushroom soup

Crucially, a specification along these lines is ruled out by the lexical constraints that *flink* imposes on the interpolation in the conflict-based case: the relevant polymorphic type only allows for the interpolation of eventualities to which the compositional target contributes the highest-ranked argument type; see a^1 in (66). This grammatical restriction would not be fulfilled if, for instance, a preparation event (or any other event with the mushroom soup as a lower ranked argument) were interpolated. As a consequence, ϵ_{sfm} in (66) cannot be identified with PREPARE for linguistic reasons, irrespective of general conceptual considerations. Hence, coercion cannot be considered a purely pragmatic phenomenon; in lieu thereof, it calls for a finely-tuned interplay between lexicon, composition, and pragmatics.

We would like to conclude with the following complementary remarks. First, the given constraint involving the highest-ranked argument type does not concern cases where the composition proceeds directly via an explicitly given eventuality. According to the entry in (58), this target eventuality must be of type $EVTY_{sfm}$ and, thus, unfold in terms of small fast movements. However, there is no further information about its arity or the types of its arguments; therefore, (26a)/(26b) and (67) are predicted to be felicitous. Recall as well that the example in (68) (= (16b) from above) is said to be infelicitous because the given eventuality does not build on small fast movements; this explanation does not directly rely on restrictions on thematic arguments, but on restrictions on the eventuality itself.¹³

- (68) #das flinke Sich-Öffnen der Tür
the nimble REFL-opening of the door

¹³ In other words, the type justification cannot proceed directly via $EVTY_{sfm}$: *flink* presupposes an event that builds on small fast movements, but the given target does not provide it. One might try to take the alternative route via the polymorphic type. However, this is not feasible either: eventualities generally do not move, which makes it impossible to resolve the default in (i).

(i) $(a^1 \sqsubseteq EVTY_{\lceil \wedge \vec{a} \sqsubseteq ENTITY_{\lceil} \rceil}) > \epsilon_{sfm}(a^1 \lceil \vec{a} \rceil) = ?_{sfm}(a^1, a^2)$

Second, as shown above, *schnell* has a wider distribution than *flink*. This is captured by more liberal presuppositions. That is, the entry in (69) (= (42) above) does not require the relevant eventuality to involve a certain internal movement structure. Moreover, the polymorphic type to be used in conflict-based cases does not determine which thematic role the compositional target fills within the interpolated eventuality (recall that the curly brackets symbolize the lack of an ordering of the thematic argument types). For instance, (25b) receives the revised logical representation in (70), which smoothly allows for an appropriate default identity as in (71) and, thus, readings such as ‘mushroom soup prepared quickly’ or ‘mushroom soup eaten quickly’.¹⁴

$$(69) \quad \llbracket \text{schnell} \rrbracket = \lambda P \lambda x \lambda \pi . \text{schnell}(x, \pi * \text{ARG}_1^P: \text{TY}^{ps}(P) * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\{\llbracket \alpha_1, \dots \rrbracket \text{TY}^+(P)\})) \wedge P(x)(\pi)$$

$$(70) \quad \llbracket \text{schnelle Pilzsuppe} \rrbracket \\ = \lambda x: \text{FOOD} \lambda \pi \exists e: \epsilon(\{\llbracket \alpha_1, \dots \rrbracket \text{MUSHROOM SOUP}\}) \llbracket \exists v_1: \dots \rrbracket \\ [\text{schnell}(e, \pi) \wedge \phi_{\epsilon(\{\llbracket \alpha_1, \dots \rrbracket \text{MUSHROOM SOUP}\})}(e, \{\llbracket v_1, \dots \rrbracket x\}, \pi) \\ \wedge \text{mushroom soup}(x, \pi)]$$

$$(71) \quad (\bar{a} \sqsubseteq \text{ENTITY} \wedge a^m \sqsubseteq \text{FOOD}) > \epsilon(\{\bar{a}, a^m\}) = \text{PREPARE} \sqcup \text{EAT}(a^1, a^m)$$

Finally, we would like to briefly consider *rasch* ‘rapid’. The overview in Section 2.2 has shown that it involves (partly) opposite restrictions to those on *flink*. In particular, the contrast in (72) (= (30) and (31a)) indicates that it licenses the interpolation of only (at least) binary eventive relations instead of unary ones. Recall as well that the coercion-based examples obey stricter constraints than cases where *rasch* targets an explicitly given eventuality. Therefore, while the combination with an explicit unary predication such as *grow* is fine in (73) (= (33)), (72b) does not have this interpretation.

- (72) a. eine rasche Pilzsuppe
 a rapid mushroom soup
 ‘a mushroom soup prepared / eaten rapidly’

¹⁴ Notably, the given entry would also allow for the interpolation of a three-participant eventuality with the compositional target being the second participant. However, examples such as *ein schnelles Geburtstagskind* ‘a quick birthday child’ do not seem to potentially refer to a birthday child to whom someone hands a present within a short amount of time. Therefore, the proposed entry is probably too liberal. This does not impair the main point we want to make here; in fact, it brings out yet again that the combinatorial options must be constrained by fine-grained lexical knowledge. However, we admit that some work still needs to be done in order to get to a perfect match between the entry and the data.

- b. #eine rasche Maus
 a rapid mouse
- (73) eine rasch wachsende Maus
 a rapidly growing mouse

We have concluded that *rasch* necessarily predicates high velocity of eventualities as wholes, which suggests an approximated lexical entry as in (74). The entry states that the first argument of *rasch* must be a holistic eventuality. As before, the polymorphic type guides the interpretation of conflict-based examples such as in (72). It links the compositionally given target to its lowest ranked argument type while also enforcing the interpolation of at least one additional argument slot; see that α_1 is not marked as optional. This rules out the interpolation of, for instance, unary eventive types such as GROW.

- (74) $\llbracket \text{rasch} \rrbracket = \lambda P \lambda x \lambda \pi . \text{rasch}(x, \pi * \text{ARG}_1^P : \text{TY}^{ps}(P))$
 $* \text{ARG}_1^{\text{rasch}} : \text{EVTY}_{hol} - \epsilon_{hol}(\alpha_1[\dots] \text{TY}^+(P)) \wedge P(x)(\pi)$

For reasons of space, we cannot provide a full analysis of *rasch* here. However, this brief overview shows that the behavior of *flink* is not a singular peculiarity, but indicative of a more general and often underestimated aspect of natural language interpretation: in virtue of abstract lexical information, conceptual information provided by type-related defaults and context can gain access to the composition.

4 Coercion by modification: Implications for the conception of modification as a combinatorial process in its own right

In the preceding sections, we focused on a detailed analysis of a revealing test-case for coercion by modification and defended a type-logical approach to it. In this section, we will relate our results to the nature of modification more generally. It is standardly assumed that modification is a combinatorial process in its own right. More concretely, modifiers are usually distinguished from both arguments and quantifiers in not changing their target's logical type; see, for instance, McNally 2016 and Bücking 2018. The present exemplification of coercion by modification has two major implications for this assumption worthy of closer scrutiny.

The first implication relates to the question of whether the present account of coercion by modification is in keeping with the given standard definition for modifiers. The entries in (75), repeated from (36) and (42) above,

show that it is: the adjective denotes an endotypical function the combination of which with the unary nominal predicate again yields a unary predicate.

- (75) a. $\llbracket \text{Zigarette} \rrbracket = \lambda u \lambda \pi'' . \text{cigarette}(u, \pi'' * \text{ARG}_1^{\text{cigarette}} : \text{P-ART})$
 b. $\llbracket \text{schnell} \rrbracket = \lambda P \lambda x \lambda \pi . \text{schnell}(x, \pi * \text{ARG}_1^P : \text{TY}^{ps}(P) * \text{ARG}_1^{\text{schnell}} : \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{TY}^+(P)\})) \wedge P(x)(\pi)$

This result is less trivial than it seems. We have emphasized that the nominal presuppositions must percolate to the context parameter of the adjectival modifier. Only this ensures a local interpolation of an additional event variable and, thus, complies with the empirical observation that *schnelle Zigarette* denotes a set of cigarettes, but not a set of eventualities. However, in Asher’s original proposal, such a percolation is feasible only from a functor to its arguments, and not vice versa. He therefore must assume that nouns are prophylactically endowed with additional argument slots for modifiers, as exemplified by the nominal entry in (76a). Correspondingly, the modifier itself would not involve the presuppositions of its target, as indicated by the entry in (76b). (See Asher 2011: (8.43)/(8.44) for analogous entries.)

- (76) a. $\llbracket \text{Zigarette} \rrbracket = \lambda \mathcal{P} \lambda u \lambda \pi'' . \mathcal{P}(\lambda x \lambda \pi . \text{cigarette}(x, \pi))(u)(\pi'' * \text{ARG}_1^{\text{cigarette}} : \text{P-ART})$
 b. $\llbracket \text{schnell} \rrbracket = \lambda P \lambda x \lambda \pi . \text{schnell}(x, \pi * \text{ARG}_1^{\text{schnell}} : \text{EVTY} - \epsilon(\{\ulcorner \alpha_1, \dots \urcorner \text{TY}^+(P)\})) \wedge P(x)(\pi)$

In short, as their inclusion changes the logical type of their nominal targets, attributive adjectives cannot be considered true modifiers anymore. Our proposal circumvents this counterintuitive consequence by dissociating the percolation of type presuppositions from functor argument relations on the ordinary intensional level. Specifically, the adjectival modifier itself maps the target’s presuppositions, that is, $\text{TY}^{ps}(P)$ in (75b), to its own context parameter and thereby makes them locally relevant to its presupposition site. This move renders the nominal entry clearly more parsimonious than in Asher’s approach and conforms to the standard definition of modification as a combinatorial process in its own right.

The second implication relates to the question of how predicate modifiers are integrated computationally. There are basically two prominent options: predicate modifiers can be considered higher-ordered endotypical functions that combine with their targets by functional application. Obviously, this is

the route that the proposal as laid out so far takes. Alternatively, predicate modifiers can be said to contribute simple predicates that combine with their targets via a separate mechanism such as the modification template MOD in (77); see, for instance, Maienborn & Schäfer 2011.¹⁵

$$(77) \quad \text{MOD: } \lambda Q \lambda P \lambda x \lambda \pi. Q(x)(\pi) \wedge P(x)(\pi)$$

This raises the question of whether coercion by modification could also be handled by using such a separate mechanism. We will now briefly discuss a possible implementation and argue that MOD cannot adequately capture a modifier's coercive potential.

As is well known, MOD as formulated in (77) predicts no direct interaction between the predicates that are combined. This is clearly at odds with the fact that coercion builds on a relevant interaction between their presuppositions. In order to facilitate such an interaction, we propose amending MOD with the following condition. The presupposition parameter percolating to Q is amended with the type presuppositions that P assigns to its first argument; see the revised version in (78).

$$(78) \quad \text{MOD: } \lambda Q \lambda P \lambda x \lambda \pi. Q(x)(\pi * \text{ARG}_1^P: \text{TY}^{ps}(P)) \wedge P(x)(\pi)$$

Insofar as Q is eventually identified with the modifying predicate while P gets its value from the modifiee, a potential conflict between P 's and Q 's types is resolved locally to the modifier's predicate. For exemplification, consider the derivation in (80), which is based on combining the simple predicates in (79) via the revised version of MOD.

$$(79) \quad \begin{array}{l} \text{a. } \llbracket \text{Zigarette} \rrbracket = \lambda u \lambda \pi''. \text{cigarette}(u, \pi'' * \text{ARG}_1^{\text{cigarette}}: \text{P-ART}) \\ \text{b. } \llbracket \text{schnell} \rrbracket = \lambda y \lambda \pi'. \text{schnell}(y, \pi' * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\dots)) \end{array}$$

$$(80) \quad \begin{array}{l} \text{MOD } \llbracket \text{schnell} \rrbracket \llbracket \text{Zigarette} \rrbracket \\ = \lambda x \lambda \pi. \text{schnell}(x, \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART} * \text{ARG}_1^{\text{schnell}}: \text{EVTY} - \epsilon(\dots)) \\ \wedge \text{cigarette}(x, \pi * \text{ARG}_1^{\text{cigarette}}: \text{P-ART}) \end{array}$$

¹⁵ The very same effect can be achieved via a separate rule such as Predicate Modification; see, for instance, Heim & Kratzer 1998. For the following discussion, nothing hinges on a decision between MOD and Predicate Modification. Note as well that MOD as given in (77) differs from more standard versions by endowing the predicates with a presuppositional parameter. This is a (trivial) prerequisite for an adequate comparison with the type-logical approach based on higher-ordered functions.

As desired, (80) represents the conflict between P-ART and EVTY within the adjectival context parameter. This correctly predicts that the polymorphic type licenses the local interpolation of a mediating eventuality. However, there remains the following fundamental problem: MOD does not allow for systematically linking the polymorphic type $\epsilon(\dots)$ to P , that is, to the type of the nominal target *Zigarette*. As ‘...’ symbolizes, the internal structure of the polymorphic type is not specified at all. The entry in (79b) strongly suggests that this problem is inevitable. A simple predicate such as *schnell* might ‘know’ of some arbitrary polymorphic type $\epsilon(\dots)$. However, since it does not lexically relate to its potential targets, it cannot specify the internal structure of this polymorphic type and thereby restrict the alternative justification route in any substantial way. As such restrictions are at the heart of an appropriate account of coercive potentials — recall, in particular, the manifold fine-grained differences discussed in Section 2.2 — we conclude that MOD is not an alternative for modeling coercion by modification.

5 Conclusion

This paper was concerned with the semantics and pragmatics of coercion by modification. Based on an in-depth study of the event-sensitive adnominal modifiers *schnell* ‘quick’, *flink* ‘nimble’, and *rasch* ‘rapid’, we identified the following key traits. First, predicates introduce presuppositions that are sensitive to types such as events or physical artifacts; they are thus sensitive to types that are more fine-grained than standard types such as entities, truth-values, and worlds. Furthermore, irrespective of potential coercions, the typing information is kept intact throughout the derivation of complex meanings. Second, the coercion by adnominal modifiers operates on the level of the local predication as introduced by the modifier. While the modifiee projects its content to this local site, its own predication thus remains unaffected by the modification. Third, the kindred modifiers exhibit subtly distinct coercive potentials and thereby substantiate the need for an integration of fine-grained conceptual knowledge into the composition. Most notably, *schnell* allows for a conflict-based interpolation of a transitive event predication, while *flink* forbids a mediating transitive event predication (with the explicit entity as the lowest-ranked argument) and *rasch* enforces one. The central upshot of these traits is that coercion is rooted in the lexical and, thus, linguistic system. This conclusion is not contradicted by a crucial fourth trait of coercion by modification, namely, its sensitivity to the context. For one, the

context has the final say in the specification of underspecified material that is introduced in the course of coercion; furthermore, the context can induce type conflicts that are not called for by the underlying lexical information.

In order to capture this systematic interaction between rigid lexical and context-sensitive conceptual knowledge without giving up their principled distinction, we argued for a type-logical approach to coercion by modification, following Type Composition Logic as laid out in [Asher 2011](#). We took advantage of its distinction between ordinary intensional semantics and a layer of interpretation that is sensitive to more fine-grained typing information. In particular, we employed polymorphic types as a lexical means in order to both license and substantially constrain the dynamics of coercive potentials. Our version of a dynamic lexical semantics advances Asher's proposal in the following respects.

First, we corroborated Asher's claim that the very same lexical item can impose different requirements on interpretations that are based on a type-conflict than on interpretations that do not involve a repair. Our data show that this applies not only to complement coercion, but also to coercion by modification. This result is not minor; it indicates that comparable fine-grained distinctions play a fairly general role within lexical systems. Second, we defended an employment of polymorphic types that takes their particular shape seriously. Specifically, we argued that they integrate information about the arity of types and the order of their arguments. Correspondingly, rules for default specifications are rendered sensitive to these details as well. The main consequence is that the conceptual system itself is structured in a grammatically relevant way, which certainly deserves closer scrutiny in future research. Third, in order to facilitate an adequate percolation of typing information, Asher treats modifiers as arguments of their targets. In lieu of this counterintuitive treatment, we proposed a standard composition of modifiers in terms of higher-ordered functional application. In particular, the adequate percolation of typing information is captured by lexical means: the local predication of the modifier simply inherits the presuppositions of the target. We finally argued that a separate rule such as predicate modification cannot handle the lexeme-specific constraints that coercion by modification is subject to.

We conclude by pointing to three follow-up questions. The first question addresses the relation between coercion accounts and underspecification accounts. We have emphasized that the pursued coercion account is well equipped for rendering combinatorial options dependent on whether

the composition proceeds directly or triggers a conflict-based repair. This is less clear for underspecification accounts as proposed by Dölling (2003, 2005, 2014) and summarized in the introduction. One standard assumption is that these accounts are in principle insensitive to this distinction, given that they build on only one type of composition. However, Bücking (2018) suggests a more cautious point of view. He notes that the given findings can be reconciled with an underspecification account once it factors fine-grained typing presuppositions into the relevant underspecified relation variable. In a nutshell, by assuming that the relation variable can be resolved either to identity — which, obviously, does not involve any fine-grained constraints — or to a mediation by some mediating entity — which can be endowed with arbitrarily fine-grained typing constraints — underspecification accounts could exactly mirror the effects of the proposed coercion account. Notably, however, an underspecification account along these lines would go well beyond a simple combination of predicates via some arbitrary underspecified relation variable. Furthermore, it would still not comply with a natural procedural distinction between a direct composition on the one hand and a conflict-based composition on the other hand.

The second question relates to the conclusion that coercion by modification enforces a composition of modifiers in terms of higher-ordered functional application. This conclusion raises anew the much discussed question of how to adequately model predicative functions of adjectives. The higher-order type for adjectives as enforced by the coercion facts is incompatible with direct application to individuals. Therefore, one must assume either flexible types for adjectives or some additional closure operation for the superfluous predicate argument of the higher-order adjective. What is more (and has rarely been addressed in the literature so far), the coercive potential of adjectives is more restricted in their use as predicates than it is in their use as modifiers. For instance, (81a) conveys that the trout was swimming quickly, whereas it is considerably more difficult to get a reading according to which the trout was prepared quickly. That is, the interpolation of a transitive event predication is not readily available. This is mirrored by the fact that (81b) is deviant: it cannot readily convey that the cigarette was smoked or rolled quickly. As discussed at length in the preceding sections, corresponding modifiers allow the interpolation of adequate transitive event predications in both cases.¹⁶

¹⁶ An anonymous reviewer argues that specific contextual information facilitates transitive interpretations for direct predications as well; see his/her example in (i).

- (81) a. Die Forelle war schnell.
 the trout was quick
 b. #Die Zigarette war schnell.
 the cigarette was quick

We will leave a thorough survey of coercion by predication and a discussion of its limits and its ramifications for an adequate model of direct predication in general to future research. This brief illustration, however, brings out once again our central claim that coercion is based on fine-grained lexical constraints and context-sensitive composition within the linguistic system.

This raises a final third question. Our focus has been on the grammatical roots of possibly fairly idiosyncratic coercive potentials and constraints. Technically, this set-up licenses the formulation of arbitrary coercions across all kinds of domains. For instance, there is no principled ban on a linguistic system with locatives that allow the interpolation of locata in combination with facts and thus predict *#fact on the table* to be felicitous. In other words, we have not yet determined any principled restrictions on polymorphic types in general. This conclusion is certainly unsatisfactory from an explanatory point of view. The crucial task for future research thus is to identify the general patterns that form the basis of coercive potentials and constraints and that thereby limit the bridging between conceptual domains in a principled way.

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- (i) Today's menu was such a pain to cook. The meat took so long. The mushrooms were eternal. And the cheesecake! Oh well, at least the trout was quick!

While we share this intuition with the reviewer, we still believe that the relevant coercion by predication needs more contextual support than its counterpart based on modification.

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Sebastian Bücking
Collaborative Research Center 833
University of Tübingen
Nauklerstr. 35
72074 Tübingen
sebastian.buecking@uni-tuebingen.de

Claudia Maienborn
Deutsches Seminar
University of Tübingen
Wilhelmstr. 50
72074 Tübingen
claudia.maienborn@uni-tuebingen.de