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Unifying Illegally

1. Introduction

A puzzling observation, first noted in Austin 1956, is that the syntactic position of an adverb can affect the meaning of a sentence.

- (1) a. Clumsily he trod on the snail. (Austin 1956)
b. He trod on the snail clumsily.
- (2) a. Cleverly, John dropped his cup of coffee. (Jackendoff 1972)
b. John dropped his cup of coffee cleverly.
- (3) a. Louisa rudely departed. (McConnell-Ginet 1982)
b. Louisa departed rudely.
- (4) a. Appropriately, Kim kissed Sandy. (Wyner 1994)
b. Kim kissed Sandy appropriately.

In (2a), John was clever to drop his coffee when he did. In (2b) however, the way in which he dropped it was clever. Similarly, in (3a), it was rude of Louisa to depart when she did. In (3b), her timing may have been fine, but some aspect of her departure was rude.

There are two ways that this pattern has been accounted for. The first, proposed in different ways by Thomason and Stalnaker 1973 and Cresswell 1977, explains the meaning differences in terms of scope. Adverbs in the sentence-initial position (which I will call *high* adverbs) compose with something other than what sentence-final (*low*) adverbs compose with. I will call this the *scope approach*.

The second kind of approach proposes that adverbs have multiple lexical entries, related by a lexical rule. According to McConnell-Ginet 1982 the two uses of adverbs like *rudely* (3a-3b) involve different words of different syntactic category. Their meaning is connected by a lexical rule. I will call this the *lexical approach*.

Recent work has tended to offer mixed approaches. Wyner 1994 suggests that *rudely* is ambiguous between a “whole-event” and a manner reading, where rudeness is predicated of maximal events and subevents respectively. Geuder 2000 puts the brunt of the work into the lexicon. Ernst 2002 presents a

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mixed approach, appealing both to scope and lexical rules, that derives manner adverbs from sentence adverbs.

The lexical and mixed approaches, while quite effective, are counter-intuitive - the different lexical entries behind a single surface form appear in complementary distribution. They are also too powerful - lexical rules of this kind can describe many meaning changes in adverbs that are never seen. This paper argues for the scope approach, and suggests that the meaning differences between the manner and clausal uses can be analyzed without resorting to a lexical rule or ambiguity. I present this argument through a case study of the adverb *illegally*. My proposal extends to a class of adverbs that have been traditionally analyzed as agent or subject oriented, including *rudely*, *politely*, *legally*, *cleverly*.² I also account, in somewhat less detail, for the pre-adjectival form of *illegally*. Due to space limitations, I will not be able to discuss the adjectival *illegal*.

This analysis assumes that what combines with the sister of an adverb is not necessarily the lexical form of the adverb, but can be a type-shifted version of this adverb. This idea originates with Morzycki 2002, which says that “Each position [for a modifier] ... is not so much the natural home for a particular kind of modifier as for a particular kind of interpretation”. On the view here, the kind of interpretation of a use of an adverb is determined entirely by the compositional surroundings. The range of surroundings that I will consider is given in (5-7).

- (5) Illegally, Alfonso moved a pawn.
- (6) Alfonso moved a pawn illegally.
- (7) “It’s like having a radio with an illegally tall antenna,” he says. (Google)

The remainder of §1 discusses background assumptions and terminology. In §2-4 I give independent semantics for the structurally high, low, and pre-adjectival uses respectively. The “unifying” happens in §5, where I factor out what each use has in common. This common part forms the core lexical meaning of the modifier, and the remainder is treated as a family of type-shift operators that coerce sentence modifiers into modifiers of unsaturated types. These type-shifts apply generally across a class of adverbs that are in their basic form, sentence-operators. Finally, in §6 I demonstrate how to extend the analysis to other adverbs, and argue that agent-orientation, comparison class sensitivity, and gradability fall out from the modal force of the adverbs.

1.1. Background

1.1.1. Why *Illegally*?

Illegally is interesting for several reasons. It shows a meaning difference depending on syntactic position. However, factors that have been associated with this difference such as agent-orientation (Jackendoff 1972; Wyner 1994; Ernst 2002), and comparison-class sensitivity (Ernst 2002) are absent. There is also very little effect of gradability. Considering adverbs in the absence of these factors leads to a view of the factors as derived or secondary, a view I pursue in §6.

Another reason for focusing on *illegally* is that judgments about legality in situations involving games with small sets of rules such as chess can be made very clear; in fact much more clear than examples involving, say, rudeness or cleverness.

1.1.2. Terminology

I will assume that, with respect to truth-conditional meaning, there are only two kinds of positions/uses for adverbs like *illegally*.³ These are the positions sometimes called “clausal” and “manner”. I will refer to these positions by the neutral structural terms *high* and *low* respectively. The use of an adverb in these positions will be referred to as the *high use* and *low use*. The analysis starts by treating each use separately, so I will subscript an adverb to indicate which use is under discussion. Thus, **illegally_H** will be *illegally* in its high position, and **illegally_L** will be *illegally* in its low position.

The notation here will be as close to Heim and Kratzer 1998 as possible, for expository clarity. This means that I will use their notational variant of a typed lambda calculus, where variable sort is indicated as part of the lambda term, and assume familiarity with their implementation of Function Application (FA) and Predicate Modification (PM).

I will use the following definition of Intensional Function Application (IFA). D_s is the domain of possible worlds.

- (8) For any constituent α , the intension of α , notated $\llbracket \alpha \rrbracket^{w,c}_\phi$, is $\lambda w' \in D_s. \llbracket \alpha \rrbracket^{w',c}$
- (9) *Intensional Function Application*
 If α and β are daughters of γ , $\llbracket \alpha \rrbracket^{w,c}$ is of any type T , and $\llbracket \beta \rrbracket^{w,c}$ is a function with a domain of type $\langle sT \rangle$, then $\llbracket \gamma \rrbracket^{w,c} = \llbracket \beta \rrbracket^{w,c}(\llbracket \alpha \rrbracket^{w,c}_\phi)$

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2. The high position

Consider the following sentences, uttered by someone describing a chess game.

- (10) Illegally, White moved.
- (11) Illegally, White moved a pawn.
- (12) Illegally, White moved a pawn diagonally.
- (13) Illegally, White moved a pawn backwards.

Sentence (10) says that it was illegal for White to move at all. White probably moved out of turn (or after the end of the game, or when the referee was not looking). Similarly, (11) says that it was illegal for White to move the pawn in question (at the relevant time). This would be true in a situation where the pawn could not move forward (it was blocked; pawns in chess cannot capture moving forward), and there were no possible captures (pawns only capture when moving diagonally to the front, and otherwise cannot move diagonally). Sentence (12) is true only when the pawn moved diagonally, and there was nothing to capture there. Sentence (13) is true in any situation where a pawn was moved backwards; pawns can never do this in chess.

In all of these cases, though there was a particular move made, it is *not* just this move that is declared illegal. In (10) it is any move by White, in (11) it is any move of the pawn (at that time), in (12) it is any diagonal move of the pawn (at that time), and in (13) it is any backward move of the pawn (at that time). These sentences rule out a class of related possible moves as illegal. No possible move at the time of the actual move, with the properties of the actual move mentioned in the sentence, would have been legal. This is why we have the intuition, in (10), that White moved out of turn; no White move at the time was legal, and this situation aptly describes moving out of turn.

Ernst 2002 proposes that adverbs in the high position can be analyzed as modifying an eventuality. The adverb would modify an event picked out by the verb, saying that the event is illegal. However, given the intuitions discussed above, the adverb would need to modify not just the particular eventuality that is asserted to have occurred, but an entire class of eventualities that might have occurred. Ernst's proposal also uses a particular comparison class, saying that the event was *Adv* in relation to other events that might have taken place. What we want to say, however, is that all events (at that time) that meet the description of the sentence were *Adv* (as opposed to other

events that might have happened). Because of this problem, I do not adopt Ernst's analysis, though I return to the issue of comparison classes in §6.2. For similar reasons, I do not adopt Wyner 1994's analysis, where the high position involves modification of a maximal event.

Instead, I treat **illegally_H** as a sentence operator - a function from propositions to propositions. In McConnell-Ginet 1982's terms, this makes **illegally_H** an ad-sentence. *Illegally* has a deontic flavor, declaring something to be disallowed according to some rules or law. The most straightforward way to capture this in the high use would be to treat **illegally_H** as a deontic modal operator, following Jackendoff 1972. **Illegally_H** differs from a typical modal in that it is factive - sentences containing **illegally_H** entail the truth of the adverb's complement. On top of the modal character, an additional provision must be made to account for factivity.

Illegally is also context-dependent. When used in some context, it seems to make reference to a salient code of laws in that context. In the above examples, this has been the laws of chess, but it might equally well be the laws of the state, of the country, etc. To model this, I will use the semantics of modals developed in Kratzer 1977, 1981, 1991. Kratzer-style modals are interpreted relative to *conversational backgrounds* (c.b.s). A conversational background maps sets of propositions onto worlds, and serves in roughly the same capacity as accessibility functions (see e.g. Hughes and Cresswell 1996; Gamut 1990). C.b.s encapsulate the circumstantial, epistemic, and deontic background knowledge needed for interpreting modals. I treat this as the same kind of background knowledge involved in interpreting adverbs.

For example, recall that in (10), we want to say that no White move is legal. If a move is not legal, it is not sanctioned by the law (of chess). If we think of the law as a set of propositions (in this case saying things like "Chess occurs in turns. White and Black alternate turns. Each can only move in their turn." and so on), White moving at all cannot follow from these propositions. A set of propositions is a set of sets of worlds, so that White cannot have moved in any worlds in the union of these sets. That is, in no world that accords with the law is it true that White moved. A conversational background is the object furnished by the context which picks out, in each world, the set of propositions that make up a body of law.

For the sake of exposition, I will use a singly relative modal operator for the modal component of **illegally_H**. This means that I will not formally represent an ordering semantics or theory of inertial worlds in formulas. Kratzer's treatment is doubly-relative, interpreting modals w.r.t. to an ordering source

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and a modal base. The ordering source orders accessible worlds relative to some set of propositions. I do assume informally that an ordering semantics is operating in the background, and make several assumptions about how it is behaving.⁴

The definitions for modal operators and **illegally_H** are given in (14-17).

- (14) A conversational background (c.b.) b is *legal* iff it maps to each world a set of propositions given by a single legal system in those worlds.⁵
- (15) *Singly-relative necessity*: A proposition p is a necessity in a world w in view of a conversational background b iff
 $[\forall w' : w' \in D_s \wedge w' \in \cap b(w)] (w' \in p)$
- (16) *Singly-relative possibility*: A proposition p is a possibility in a world w in view of a conversational background b iff $\neg p$ is not a necessity in w in view of b .
- (17) $\llbracket \text{illegally}_{\mathbf{H}} \rrbracket^{w,c}$ is defined iff c picks out exactly one conversational background that is legal.⁶ In this case,

$$\llbracket \text{illegally}_{\mathbf{H}} \rrbracket^{w,c} = \lambda p \in D_{\langle st \rangle} \cdot \left(\begin{array}{l} p(w) \\ \wedge \neg(p \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$

where b_c is the legal conversational background picked out by c

(17) straightforwardly casts the adverb as a negated (due to “il-”) possibility operator, with two modifications.

Unlike a normal modal, **illegally_H** is “factive”. While it rules out the truth of a proposition in deontically ideal worlds, it still asserts the truth of the proposition in our world. I have cast this as straightforward entailment, but it might be considered to be presupposition.⁷ This also results in the entailment that the proposition is illegal in our world.

Secondly, the conversational background is lexically restricted in a stronger fashion than is typical for a modal. That is, modals impose only large-scale restrictions in the kind of c.b. they use, such as deontic vs. epistemic. To the best of my knowledge, no true modals force the background to be something as specific as sets of rules or laws.

Now for an example. I will show the computation of (10) to demonstrate how the high use works. Later I’ll give a denotation of this sentence with a more complex event semantics, but for this example I’ll assume that *move* denotes a predicate of individuals:

- (18) $\llbracket \text{move} \rrbracket^{w,c} = \lambda x \in D_e . x \text{ moved in } w$

- (19) $\llbracket \text{illegally}_H, \text{white moved} \rrbracket^{w,c} = 1$ iff
 $\llbracket \text{illegally}_H \rrbracket^{w,c}(\llbracket \text{white moved} \rrbracket^{w,c}) = 1$ iff
 $\llbracket \text{illegally}_H \rrbracket^{w,c}(\lambda w' \in D_s. \text{white moved in } w') = 1$ iff
 $\left(\begin{array}{l} \text{White moved in } w \\ \wedge \neg((\lambda w' \in D_s. \text{White moved in } w') \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$

The sentence asserts two things: (i) White moved in the evaluation world, and (ii) In all legally ideal worlds (w.r.t. the body of law picked out, which is the laws of chess) it's false that White moved.

3. Low position

The predominant trend in analyzing low/manner adverbs in recent work has been to take them to be predicates of events, following Davidson 1967's treatment of other adverbials. I follow this trend, and in particular I assume the neo-Davidsonian analysis (Parsons 1990; Wyner 1994; Eckardt 1998; Landman 2001, among others)⁸

Consider the sequence of claims, again about a chess game, in (20-23).

- (20) White moved illegally.
(21) White moved a pawn illegally.
(22) White moved a pawn diagonally illegally.
(23) White moved a pawn backwards illegally.

A sentence like (20) is true if some aspect of White's move constituted a violation of the law. We are not told which aspect, and there may have been other aspects which did not violate the law. I take this to be the most important intuition about the low position sentences.

Unlike the parallel high-position sentence (10), (20) says nothing about moves that White did not make. The sentence declares the particular move White made to have been illegal, and nothing more. All the other sentences are the same, except that they provide more information about the move. In fact, they could all be true in the same context, a property which the high-position sentences in (10-13) do not have.

I will make two basic assumptions about eventualities. First, I will take them to be particulars, in their own domain D_v . Second I will assume Kratzer 1996's "severing" of the agent argument from the verb. On this view, the verb does not lexically have an external argument, but this argument is added in by a Voice head in the Infl range.

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$$(24) \quad \llbracket \mathbf{Voice} \rrbracket^{w,c} = \lambda P \in D_{\langle vt \rangle} . \lambda x \in D_e . \lambda e \in D_v . P(e) \wedge \mathbf{Agent}(e, x)$$

In most neo-davidsonian systems, the event argument is saturated by an existential quantifier at some point in the derivation. It is not clear where this quantifier is introduced compositionally. Kratzer 1998 makes it part of the meaning of Aspect morphemes, but other authors (e.g. Landman 2001; Chung and Ladusaw 2004) assume a type-shift or compositional operation called Existential Closure (EC), which gets applied when we have an unsaturated predicate and need a saturated one. I will assume that EC is a type-shift applying as a last resort, and that composition of a sentence is not complete unless the top node is a truth value.

$$(25) \quad \textit{Existential Closure}$$

If a constituent α denotes a function of type $\langle vX \rangle$ for any type X , then $\text{EC}(\llbracket \alpha \rrbracket^{w,c}) = \exists e \in D_v . \llbracket \alpha \rrbracket^{w,c}$.

Verb denotations take the following form:

$$(26) \quad \llbracket \mathbf{move} \rrbracket^{w,c} = \lambda e \in D_v . e \text{ is a moving in } w$$

A verb binds the event to the evaluation index, as well as picking out its type. I am informally assuming a theory of counterpart relations that applies to the domain of eventualities as well as individuals (Lewis 1968, 1986, among others). An event that has no counterpart in w would make a verbal predicate false at w - this is the main effect of the “in w ”.

Given these assumptions, we are now in a position to define **illegally_L**. As with the high use, I will use deontic modality, but the immediate application of it is slightly more complicated than for the high case. If an event is illegal, it has some aspect that is not allowed in deontically ideal worlds. We can model this by ruling out occurrences of the actual event (that are sufficiently similar to it) in the ideal worlds.

I will assume that the ordering semantics or theory of inertia worlds will cause us to consider only worlds that are close enough so that if an event has an occurrence (i.e. a counterpart), that occurrence shares all properties of the actual event. No event will have a counterpart in an ideal world that is not identical to it. Thus, a predicate like $\llbracket \mathbf{move} \rrbracket^{w,c}$ will be true in w of an event that occurs in w' only if that event has an identical counterpart in w .⁹

By abstracting over the evaluation world and applying the event argument, we can form a proposition of the right kind.

- (27) $\llbracket \text{illegally}_{\mathbf{L}} \rrbracket^{w,c}$ is defined iff c picks out exactly one conversational background that is legal. In this case,
- $$\llbracket \text{illegally}_{\mathbf{L}} \rrbracket^{w,c} = \lambda P \in D_{\langle s, \langle vt \rangle \rangle} \cdot \lambda e \in D_v \cdot \left(\begin{array}{l} P(e) \\ \wedge \neg((\lambda w' \in D_s \cdot P(w')(e)) \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$
- where b_c is the legal conversational background picked out by c .

This denotation has two main components. Using the letter V to stand in for the constituent **illegally_L** modifies, a V -ing **illegally_L** is also a V -ing in the evaluation world. This is the low position correlate of factivity. Additionally, in legally ideal worlds, it is not possible for such an event to take place. By ruling out identical counterparts of the event, we entail that some property of the event has caused it to be disallowed from occurring in worlds that are legally ideal.

Let us consider the example computation of (20), assuming the structure in (20') and that *White* is a proper name,

- (20') $[\text{TP White} [\text{Voice} [\text{VP moved illegally}]]]$

In the following formulas, b_c always refers to the unique legal background picked out by the context. I will start from the bottom and work upwards. **Illegally_L** and *moved* need to combine via Intensional Function Application, as the denotation of **illegally_L** takes the intension of a predicate of events for its first argument. Combining the two (and assuming the context will provide a suitable conversational background) gives us:

- $\llbracket \text{illegally}_{\mathbf{L}} \rrbracket^{w,c}(\llbracket \text{moved} \rrbracket^{w,c} \phi) =$
- $\lambda e \in D_v \cdot \left(\begin{array}{l} e \text{ is a moving in } w \\ \wedge \neg((\lambda w' \in D_s \cdot e \text{ is a moving in } w') \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$

Next, the Voice head introduces an argument place in the composition for the external argument.

- $\llbracket \text{Voice} \rrbracket^{w,c}(\llbracket \text{illegally}_{\mathbf{L}} \rrbracket^{w,c}(\llbracket \text{moved} \rrbracket^{w,c})) =$
- $\lambda x \in D_e \cdot \lambda e \in D_v \cdot \left(\begin{array}{l} \text{Agent}(e, x) \\ \wedge e \text{ is a moving in } w \\ \wedge \neg((\lambda w' \in D_s \cdot e \text{ is a moving in } w') \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$

Next, the external argument composes straightforwardly by Function Application, and Existential Closure saturates the event argument to create a truth-value. Substituting the definition of possibility, we get the final result:

$$(28) \quad \llbracket \mathbf{White\ Voice\ moved\ illegally}_L \rrbracket^{w,c} = 1 \text{ iff}$$

$$\left(\begin{array}{l} \exists e : e \in D_v \left(\begin{array}{l} \wedge \text{Agent}(e, \text{White}) \\ \wedge e \text{ is a moving in } w \\ \wedge [\forall w' : w' \in D_s \wedge w' \in \cap b_c(w)] (\\ \quad \neg(e \text{ is a moving in } w')) \end{array} \right) \end{array} \right)$$

The previous example demonstrating high use did not make use of an event semantics. For the purposes of comparison, it is useful to compute the denotation of that example (10) with an event semantics. The result is:

$$(19') \quad \llbracket \mathbf{illegally}_H, \mathbf{white\ moved} \rrbracket^{w,c} = 1 \text{ iff}$$

$$\left(\begin{array}{l} \exists e : e \in D_v \left(\begin{array}{l} e \text{ is a moving in } w \\ \wedge \text{Agent}(e, \text{White}) \end{array} \right) \\ \wedge [\forall w' : w' \in D_s \wedge w' \in \cap b_c(w)] (\\ \quad \neg([\exists e : e \in D_v] \left(\begin{array}{l} \text{Agent}(e, \text{White}) \\ \wedge e \text{ is a moving in } w' \end{array} \right)) \end{array} \right)$$

Comparing (19') and (28) reveals that the difference between the two sentences derives from the relative scope of the universal quantifier over worlds (i.e. the possibility operator due to the adverb) and the existential quantifier introducing the event variable. In the low use, the existential quantifier over events scopes above the universal quantifier over worlds. The high use reverses this, and the universal takes scope over the existential.

4. Pre-adjectival uses

The picture becomes more complex when we consider adverbial modification of adjectives. Examples of this are most natural when the adjective is directly deverbal, but are not limited to this case. Here are some naturally occurring examples involving a variety of adverbs, and some constructed examples involving *illegally*.

(29) ...with zoomy homage to the age of the camcorder and a **clumsily realistic** spontaneity among its performers. (Google)

(30) It's called The Score, an **appropriately generic** title for a droning, high-toned little heist picture with no dash and no raison d'être. (Google)

- (31) ...the consequences of operating an **illegally uninsured** business could bring significant criminal and civil consequences. (Google)
- (32) When they find an **illegally colored** house, they'll kick down the door and drag the homeowner off to jail. (Google)
- (33) Alfonso noticed an **illegally red** house.
- (34) Alfonso noticed an **illegally built** house.

Here I will not try to account for the conditions under which *illegally* can modify an adjective, but will provide an analysis that gives the correct truth-conditions for sentences like (31-34).

Sentences involving *illegally* in this use seem to have two readings. In (33), for example, it could be that zoning laws in the town forbid red houses entirely. In this case, the sentence says that it was illegal for the house to be red at all. This meaning, like the high use, gives rise to the entailment that no other shade of red would have been acceptable; the law bans any red houses. I will call this the **whole-predicate** use, and write this version of *illegally* as **illegally_{WP}**. This use is directly analogous to the high use.

The second reading can be paraphrased by saying that the way/manner in which the house is red is not allowed. The law might allow some shades of red, but ban others. It is only the particular shade of red that matches the house that is called illegal. I'll call this second use the **sub-predicate** use, and write this version of *illegally* as **illegally_{SP}**. This use is directly analogous to the low use.

With a deverbal case like (34), this second reading comes out more clearly, although the first is still present. It may be that it was illegal to build the house in the first place (e.g. if the land is zoned for factories), or that some part of the house violates building codes (e.g. the foundation does not meet earthquake code, and the house is in California).

4.1. The whole-predicate use

Intuitively, we want **illegally_{WP}** to declare that any instantiations of the adjectival predicate combined with its noun are declared illegal. If a house is **illegally_{WP}** red, we want no legal ideals to include houses that are red at the evaluation index. This can be accomplished in a similar way to the low and high cases, where we ruled out eventualities satisfying the verbal predicate, and propositions satisfying the sentence, respectively. Here we rule out in-

dividuals satisfying the adjectival predicate. The following denotation works only for attributive adjectives that normally combine with a nominal predicate via Predicate Modification.¹⁰

$$(35) \quad \llbracket \text{illegally}_{\mathbf{WP}} \rrbracket^{w,c} = \lambda P \in D_{\langle s,et \rangle} . \lambda x \in D_e .$$

$$\left(\begin{array}{l} P(w)(x) \\ \wedge \neg((\lambda w' \in D_s . P(w')(x)) \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$

where b_c is the legal conversational background picked out by c .

This denotation is quite similar to the denotation for the low use, except that the predicates involved are predicates of individuals, not events.¹¹ The correlate of factivity in this domain is to assert that the property holds of the entity argument at the evaluation world.

Here is the denotation of “**illegally_{WP} red house**” assuming standard denotations for the other items.

- $\llbracket \text{illegally red house} \rrbracket^{w,c} = (\text{IFA}, \text{PM})$

$$\lambda x \in D_e . \left(\begin{array}{l} x \text{ is red in } w \\ \wedge x \text{ is a house in } w \\ \wedge \neg((\lambda w' \in D_s . x \text{ is red in } w') \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$

where b_c is the legal conversational background picked out by c .

In English, it is not possible for the house to have counterparts in ideal worlds and still be red. The house in the evaluation world, however, is red.

4.2. The Sub-predicate use

I will analyze this reading by assuming that **illegally_{SP}** modifies a predicate of states, just as **illegally_L** modifies an event-predicate. This requires assuming that at least some adjectives have a state argument that is saturated by existential closure. This has been independently proposed by Parsons 1990 §10.4. We also must assume that there is such a thing as a particular state. An *illegally red house* on this reading is a house where there is a state of redness, the house is in that state, and the particular state of redness that the house is in does not occur in legally ideal worlds.

If this analysis is right, the denotation of **illegally_{SP}** would be identical to the denotation for the low use, assuming that D_v contains states as well as eventualities of other kinds.

5. Unification

In the previous sections, I have accounted independently for the high (clausal) and low (manner) uses of *illegally*, as well as two pre-adjectival meanings. This section unifies these uses, extracting a single core lexical meaning, and a family of type-shifts which apply to allow the adverb to compose in a variety of positions.

For the sake of comparison, here are the denotations of each use laid out next to each other. Each denotation, as before, is defined only when the context picks out exactly one legal background, and b_c in each denotation refers to this background.

- $$(17) \quad \llbracket \mathbf{illegally_H} \rrbracket^{w,c} = \lambda p \in D_{\langle st \rangle} \cdot \left(\begin{array}{l} p(w) \\ \wedge \quad \neg(p \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$
- $$(27) \quad \llbracket \mathbf{illegally_L} \rrbracket^{w,c} = \lambda P \in D_{\langle s \langle vt \rangle \rangle} \cdot \lambda e \in D_v \cdot \left(\begin{array}{l} P(e) \\ \wedge \quad \neg((\lambda w' \in D_s \cdot P(w')(e)) \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$
- $$(35) \quad \llbracket \mathbf{illegally_{WP}} \rrbracket^{w,c} = \lambda P \in D_{\langle s \langle et \rangle \rangle} \cdot \lambda x \in D_e \cdot \left(\begin{array}{l} P(w)(x) \\ \wedge \quad \neg((\lambda w' \in D_s \cdot P(w')(x)) \text{ is a possibility in } w \text{ in view of } b_c) \end{array} \right)$$
- $$(36) \quad \llbracket \mathbf{illegally_{SP}} \rrbracket^{w,c} = \llbracket \mathbf{illegally_L} \rrbracket^{w,c}$$

Anything that is common to these denotations should be part of the core meaning of the adverb. The following things are shared: (i) the “factivity”, (ii) the modal force, and (iii) the restriction on conversational backgrounds. The differences boil down to the mechanisms used to convert the modified type into a proposition. Since **illegally_H** needs no mechanisms, we can take it to be basic, and factor out the differences as follows:

- $$(37) \quad \llbracket \mathbf{illegally} \rrbracket^{w,c} = \lambda p \in D_{\langle st \rangle} \cdot p(w) \wedge \neg(p \text{ is a possibility in } w \text{ in view of } b_c)$$
- where b_c is the legal conversational background picked out by c .
- $$(38) \quad \llbracket \mathbf{illegally_H} \rrbracket^{w,c} = \llbracket \mathbf{illegally} \rrbracket^{w,c}$$
- $$(39) \quad \llbracket \mathbf{L} \rrbracket^{w,c} = \llbracket \mathbf{SP} \rrbracket^{w,c} = \lambda A \in D_{\langle \langle st \rangle t \rangle} \cdot \lambda R \in D_{\langle s \langle vt \rangle \rangle} \cdot \lambda e \in D_v \cdot A(\lambda w' \in D_s \cdot R(w')(e))$$
- $$(40) \quad \llbracket \mathbf{WP} \rrbracket^{w,c} = \lambda A \in D_{\langle \langle st \rangle t \rangle} \cdot \lambda P \in D_{\langle s \langle et \rangle \rangle} \cdot \lambda x \in D_e \cdot A(\lambda w' \in D_s \cdot P(w')(x))$$

Each of these operations can be thought of as a type-shift from a modifier of a saturated type to a modifier of an unsaturated type. The core denotation of this kind of adverb is taken to be a property of propositions. Type-mismatches

occur in the structurally low position, because in order to combine with the verb in its basic form, *illegally* would have to first trigger existential closure. The rest of the sentence would not be able to compose after this. The type-shift given by **L** resolves this type mismatch. Before an adjective, a type-mismatch occurs as well, but there are two sequences of type-shifts which can be used to resolve it. The first sequence is existential closure (over a state argument) followed by **WP**, resulting in the whole-predicate reading. The second is **L** (i.e. **SP**) followed by existential closure, and this results in the sub-predicate reading. As with the better-known nominal type-shifts (Partee 1986), these apply as a last resort, when composition would otherwise fail due to a type-mismatch.

The core lexical content contains elements shared across the class of adverbs under discussion. These elements might be factored out as well, into a (lexical) property of this class. Left behind as the core lexical content of a particular adverb would be only a restriction on the background information present in the context at the time of utterance.

Theoretically, these type-shifts have two main functions. They allow lexical meanings of adverbs to be underspecified for type, and this is why I proposed them. They are also independent of particular adverbs, and therefore allow a straightforward scope-based explanation of the low-high alternation. Ultimately, a theory-independent justification of the existence of these type-shifts (as opposed to any other possible ones) is desirable, and I will leave this to future work.

Geuder 2000 suggests (§2.2.5f, 3.6.3) that some sortal mismatches might be dealt with by employing Nunberg 1995's predicate transfer in the lexicon. While Geuder's goals are slightly different (explanation of the relationship between adjectival and adverbial forms when the adjectival is taken to be basic), the idea is similar to that of type-shifting. Predicate transfer acts as a very restricted form of type-coercion, subject to lexical idiosyncrasies. Geuder argues that a fully productive (e.g. non-lexical) approach (such as mine) would be too powerful, and that a lexical approach would allow us to specify that certain readings were blocked. However, in the class of adverbs under consideration here, I do not know of any cases of the kind of idiosyncrasy that Geuder is concerned about. The relationship between high, low, and pre-adjectival uses in this class seems entirely productive, and subject at best to pragmatic restrictions. I do not address the relationship of *illegally*-class adverbs to their adjectival form here, and this may be where lexical idiosyncrasies start to appear.

I have described one part of a family of typeshifts. They take two forms, turning a sentence operator into an event-modifier, and into a predicate-modifier. That is, we typeshift from $\langle\langle st \rangle t \rangle$ into $\langle\langle s \langle et \rangle \rangle \langle et \rangle \rangle$, and into $\langle\langle s \langle vt \rangle \rangle \langle vt \rangle \rangle$. There are other potential members of this family that have not yet been needed. For instance, we could attempt the reverse shifts, from unsaturated modifiers to saturated modifiers. The reverse type-shifts of the ones I've given are difficult to formulate without some use in mind. It does not seem to be possible to provide any type-shift that would allow an actual reversal of the shifts I've given. The technical problem is how to dispose of the unsaturated argument place.

Interestingly, the most obvious candidates for such a type-shift are “pure manner” adverbs such as *loudly* (Schäfer 2001, 2002) which seem to be more basically event predicates. At least superficially, these adverbs do not show scope effects (they perform manner modification in a high position), and the assumption that they are in their basic form event modifiers, combined with the lack of a type-shift, might explain part of their scopeless behavior.

Assuming the existence of these type-shifts, we must consider how they fit in with existing theories of the syntax of adverbs.

5.1. An alternative conception of the type-shifts

The analysis so far, relying on type-shifts, is roughly in line with the analysis of the syntax of adverbs in Ernst 2002: adverbs are adjoined where they can compose. Ernst assumes various type-shifts which are not spelled out, and the details differ greatly from here, but the type-shifts above can be thought of as making explicit some parts of Ernst's semantics for adverbs.

In Cinque 1999, the main competing approach to the syntax of adverbs, adverbs appear in the specifiers of functional projections. A functional head is associated with a class of adverbs, and only that class can appear in the specifier of that head. The type-shifting components presented above could be thought of as fixed meanings of particular functional heads. An idea of this sort has been suggested by Morzycki 2002. On this version of my analysis, the functional heads would more or less prepare their complement for composition with an adverb. While the order of composition is different, the meanings above can easily be refactored to compensate. For instance, the “manner” morpheme would look as follows:

$$(41) \quad \llbracket \mathbf{L} \rrbracket^{w,c} = \lambda R \in D_{\langle s \langle vt \rangle \rangle} . \lambda A \in D_{\langle \langle st \rangle t \rangle} . \lambda v \in D_v . . A(\lambda w' \in D_s . R(w')(e))$$

On this view, the meaning pieces introduced above would not be type-shifts, but real (though in English, invisible) morphemes in the syntax.

This demonstrates that the broad analysis here is compatible with Cinque's syntax. However, adopting the functional-head based version leaves some difficult questions.

First, I have used the same type-shift in more than one place. Both the sub-predicate and low use involve the same operation, and as suggested briefly in §4, the adjectival type-shift looks quite like the whole-predicate type-shift. This is to be expected if there are a limited number of type-shifting operations that are used as a last resort; if one can apply somewhere, it will. On a functional-head approach, however, there is no obvious reason why the same meaning would be used in fairly disparate points in the syntactic structure. On a related note, we would have to postulate an ambiguity for the morpheme introducing pre-adjectival adjectives. This ambiguity falls out naturally from the family of type-shifts I have proposed.

Second, when there is no adverb in a specifier of some functional head, we would not want the meaning pieces like (41) to appear in the functional head, because this would produce a type-mismatch in the absence of an adverb. We could solve this by putting syntactically null adverbs that defuse the functional head's type-changing component in some vacuous way, but this solution does not seem ideal. In many cases, Cinque makes use of functional heads that have been used independently for semantic purposes. In the case of functional heads that do something else (for instance if Voice on Kratzer 1996's analysis also served to introduce some class of adjectives), we would need functional heads to be systematically ambiguous. This also does not seem ideal.

Third, there is the question of why the functional heads mean the things they do. In hindsight at least, the meanings involved are fairly simple ways of shifting modifier types from saturated to unsaturated. They affect the meanings of their arguments in very minimal ways. We might expect the meanings of such functional heads to be more arbitrary than this.

These questions at their heart ask whether the functional-head based approach to adverbial syntax is, from the semantics side, too powerful. The questions do seem to lead to the conclusion that both approaches, at least with respect to the semantics, are attempting to model the same thing.

6. Other adverbs

In this section I will broaden the class of adverbs under consideration to include *rudely*, *politely*, and *legally*. What I say here applies to any adverb which can plausibly be taken to have its core lexical meaning based on a set of facts that are part of the background knowledge of a speaker. I take this to include *cleverly*, *stupidly*, *wisely*, *foolishly*, *tactfully*, *craftily*, *ostentatiously*, *graciously*, *eagerly*, *absent-mindedly*, and others which have been traditionally categorized as agent or subject oriented. Additional extensions may be possible to speaker-oriented adverbs (*frankly*, *ideally*) and domain adverbs (*mathematically*, *semantically*).

First I'll consider *legally*. Care must be taken to ignore the extra readings that this adverb has. We are only interested in one where there is permission given by some body of law, as in (42). The additional readings that *legally* has seem to be domain readings (Bellert 1977; Ernst 2004), illustrated in (43), and these are not under consideration here.

- (42) Alfonso left the country legally.
 (43) a. Alfonso is legally blind.
 b. Legally, Alfonso is skilled.
 c. Legally/(in view of the law), you must cross the street at a crosswalk.

The only difference between permissive *legally* and *illegally* on my analysis is that there is no negation; something is legal if it's possible in view of the law. The type-shifts still apply as described above.

- (44) $\llbracket \text{legally} \rrbracket^{w,c} = \lambda p \in D_{\langle st \rangle} \cdot p(w) \wedge (p \text{ is a possibility in } w \text{ in view of } b_c)$
 where b_c is the legal conversational background picked out by c .

Consider now *rudely*:

- (45) Rudely, Alfonso departed.
 (46) Alfonso departed rudely.

Rudely also has a modal character in that it involves laws of etiquette. If conversational backgrounds can be restricted to codes of permissible behavior, *rudely* can be given the obvious analysis in (47):

- (47) $\llbracket \text{rudely} \rrbracket^{w,c} = \lambda p \in D_{\langle st \rangle} \cdot p(w) \wedge \neg(p \text{ is a possibility in } w \text{ in view of } b_c)$
 where b_c is the politeness-based conversational background picked out by c .

The main difference from *illegally* is the restriction on what kind of conversational backgrounds are involved. A conversational background about politeness consists of a series of statements about what is considered polite, in some system of politeness. The ideal picked out by such a background consists of worlds where only polite things happen. We would expect all the type-shifts introduced previously to apply here.

However, there are several ways in which sentences with *rudely* differ from those with *illegally*, and I will talk about these in the following sections. My analysis makes some predictions about entailments which seem acceptable for *illegally*, but are not for other adverbs. I discuss this in §6.1. Ernst 2002 has analyzed the *rudely*-class as being sensitive to a comparison class, and I describe how to derive this in §6.2. In §6.3, I discuss the fact that rudeness has been described as a scalar or gradable notion, with a context-dependence threshold set somewhere on a scale.

I argue that none of these are problems with the proposed family of type-shifts. Each can be addressed by either making further assumptions about operators that scopally intervene between adverb positions, or making further assumptions about the structure of information picked out by various kinds of conversational backgrounds.

An important issue that I do not have space to discuss is that *rudely* and related adverbs have often been described as “subject/agent-oriented” (Jackendoff 1972, among others). *Rudely* (in some sense) predicates rudeness of the agent of the sentence, *cleverly* predicates cleverness, and so on.

6.1. Incorrect entailments

The analysis so far predicts the entailment patterns in (48) and (49) to be acceptable. Some speakers judge the entailment (48) to be valid, but (49) is clearly incorrect.

(48) ? Illegally, White moved. \models White moved illegally.

(49) * Rudely, Alfonso departed. \models Alfonso departed rudely.

For high *rudely*, there is not necessarily anything rude about how Alfonso departed; it is really just the timing of a departure, or the fact of a departure at all. We could copy the actual departing event in its entirety to another time, and it might be polite. In the low case, the timing does not come into play - it

is something essential to the particular departing that was rude. This departing would be rude in many contexts or at many times.

These patterns are predicted because ruling out counterparts of a particular event of moving/departing is a special case of ruling out all events of the agent moving/departing. The quantifier scope for the high use is $\forall x \neg \exists y \phi$, which entails $\exists y \neg \forall x \psi$, the scope for the low use, if ϕ entails ψ .¹²

Until now I have been treating tense informally. The representation of tense is the missing factor, and once we take it into account, The entailment patterns in (48) and (49) are not predicted. We also make the truth-conditions more accurate. Specifically, tense intervenes scopally between the two adverb positions, and is inside the scope of the modal force only in the high position.

Here I will consider only cases of past tense, which I will take to be referential, following Partee 1973; Kratzer 1998; Stone 1997; Schlenker 1999, 2004. A past tense morpheme acts like a pronoun in that it picks out an interval, and it says that its event argument culminates (indicated with the predicate Cul, from Parsons 1990) at that interval.

$$(50) \quad \llbracket \text{-ed} \rrbracket^{w,c,t} = \lambda P \in D_{\langle et \rangle} . \lambda e \in D_v . P(e) \wedge \text{Cul}(e, t^*, w)$$

where t^* is the interval picked out by c such that $t^* < t$.

Composition of examples (45) and (46) now results in the following formulas:

$$(51) \quad \llbracket \text{-ed Alfonso Voice depart rudely}_L \rrbracket^{w,t,c} = 1 \text{ iff}$$

$$[\exists e : e \in D_v] \left(\begin{array}{l} \text{Agent}(e, \text{White}) \\ \wedge \text{Cul}(e, t^*, w) \\ \wedge e \text{ is a departing in } w \\ \wedge [\forall w' : w' \in D_s \wedge w' \in \cap b_c(w)] (\\ \quad \neg(e \text{ is a departing in } w') \end{array} \right)$$

where b_c is the polite conversational background picked out by c , and t^* is the time picked out by c s.t. $t^* < t$.

$$(52) \quad \llbracket \text{rudely}_H, \text{-ed Alfonso Voice depart} \rrbracket^{w,t,c} = 1 \text{ iff}$$

$$\left(\begin{array}{l} e \text{ is a departing in } w \\ [\exists e : e \in D_v] \left(\begin{array}{l} \wedge \text{Cul}(e, t^*, w) \\ \wedge \text{Agent}(e, \text{Alfonso}) \end{array} \right) \\ \wedge [\forall w' : w' \in D_s \wedge w' \in \cap b_c(w)] (\\ \quad \neg([\exists e : e \in D_v] \left(\begin{array}{l} \text{Agent}(e, \text{Alfonso}) \\ \wedge \text{Cul}(e, t^*, w') \\ \wedge e \text{ is a departing in } w' \end{array} \right) \end{array} \right)$$

where b_c is the polite conversational background picked out by c , and t^* is the time picked out by c s.t. $t^* < t$.

The crucial difference between the two is that in the high position, the past tense operator is under the scope of the adverb, whereas in the low position, it is not. The high use says that no event of Alfonso departing at that time occurs in ideal worlds, and the low use says that the particular event of departing that did happen in the evaluation world has no counterparts in ideal worlds. On the low use, the time of the event is fixed in the evaluation world, but its counterparts in ideal worlds do not have fixed times. On the high use, the time is fixed across ideal worlds.

We are left with the question of why (48) seems intuitively valid for some speakers. I do not have a good answer, except to point out that both (53) and (54) seem substantially worse than (48).

(53) *? Illegally, White moved a pawn. \models White moved a pawn illegally.

(54) * Illegally, Alfonso left the country. \models Alfonso left the country illegally.

Entailment patterns of this kind do not seem as straightforward as one might expect, and more work is needed.

6.2. Comparison class sensitivity

Ernst 2002 describes *rudely* as being sensitive to comparison classes, in a way that differs between the different uses. In particular, in the high use, the actual occurrence is rude in comparison to other events that could have happened at the same time. In the low use, the actual occurrence is rude in comparison to other events of *Ving*, substituting in the verb for *V*.

My analysis suggests that the apparent comparison class sensitivity is a secondary effect, derivable from the interaction of modality and tense. To find what the comparison class consists of, we see what can potentially take the place of the actual occurrence in ideal worlds.

The high use in (45) effectively calls any event of departing at the referenced time rude. We can infer that in the ideal worlds, some other events with Alfonso as the agent took place in lieu of the departing at roughly the same time. The actual event is rude compared to these.

The low use calls the particular event that occurred to be rude. Any identical copies are ruled out, but in its place are events of departing. Since they are not counterparts of the actual departing, they may be non-identical in more ways. Thus the event seems rude in comparison to other departings that Alfonso could have been the agent of.

6.3. Gradability

Rudely is gradable; something can be done more or less rudely. Even without degree modifiers, *rudely* is scalar and sensitive to some contextual standards. That is, in one context, on a degree analysis, we might have the threshold for rudeness set different than in another context. The nature of my analysis forces this to be derived indirectly; we cannot simply place events on a scale of rudeness. I suggest that with respect to both degree modifiers, and apparent sensitivity to the position of a standard on a scale, there is only the appearance of a true linear scale. Facts about how codes of politeness relate to each other make the rudeness scale look more linear than the legality scale.

Codes of politeness are generally related. When we move from formal contexts to less formal contexts, more things become allowed, and when we move the other direction, less things become allowed. If something is not allowed in a less formal setting, it very likely is not allowed in any more formal setting. Thus, between different codes of politeness, there is the appearance of a rough subset-superset relation, and this can lead to a rough mapping on a linear scale of politeness. The most formal settings are at the top of the scale, and the least are lower down. Below those are codes of politeness you would get by subtracting restrictions from the least formal settings, though these may not be actually in force anywhere.

Laws tend to behave in a very different way. The laws of chess are completely non-overlapping with the laws of the US. Even federal laws in the US do not share much with the town laws. Though there may often be some relation between codes of law as we move from e.g. town to town, it does not look like a subset-superset relation at all. Thus there is no appearance of a linear scale, and *illegally* seems to be non-gradable.

An action is more polite than another if it is possible under more restricted (or even simply more) codes of politeness than the other. Similarly, things which are *very illegal* are things which would be illegal under a great many codes of law. If someone were to call murder very illegal (which it is), this would be what they mean.

7. Conclusions

In this paper I have defended two main claims: (i) The meaning differences induced by placing an adverb in different positions result purely from scope,

and (ii) This position is consistent with an adverb having only one lexical entry.

The positional meaning differences follow from the relative scope of the adverb with respect to the existential quantifier over events and with respect to tense. While I have confined the investigation here to sentences with simple past tense, an interesting future topic would be whether aspect plays a role, since it would also intervene scopally.

In order to give adverbs only one lexical entry, I have proposed a family of type-shifts between modifier types. As with type-shifts in the nominal domain, these apply as a last resort when composition would fail. They shift between modifiers of saturated types (sentence operators) to modifiers of unsaturated types. I have proposed that the basic lexical entries for *illegally*-type adverbs are factive modal operators, with relatively free composition mediated by type-shifts.

Much work still remains. I have only touched on the range of adverbs that show positional effects - candidates for the modal type-shifting analysis include domain adverbs (e.g. *semantically*) and speaker-oriented adverbs (*frankly*). I have argued that comparison class sensitivity and gradability can be derived from the modal force of adverbs like *rudely*, but I leave an in-depth treatment of these effects for the future.

Notes

1. Thanks to Donka Farkas, Angelika Kratzer, Marcin Morzycki, and Barbara Partee for much interesting discussion of this topic, and to James Isaacs, Ruth Kramer, and Martin Schäfer for comments on drafts of this paper. Thanks also to audiences at UMass Amherst, UC Santa Cruz, and the Event Structures workshop in Leipzig for questions and comments.
2. This class excludes “passive sensitive” or Thematically-Dependant adverbs, such as *reluctantly* and *appropriately*. See Wyner 1994 inter alia.
3. See Cinque 1999 for arguments for more distinctions. For instance, manner positions are distinguished under e.g. the middle alternation. To the best of my knowledge, all further distinctions concern grammaticality and not differences in truth-conditions.
4. In particular, I assume that the lexical content of the adverb would pick out the content of the ordering source, making it a legal ordering source for *illegally*. The modal base would be a circumstantial conversational background. The singly relative treatment uses only the legal c.b.
5. All legal conversational backgrounds are deontic, but there are deontic backgrounds which are not legal. Consider codes of behavior, politeness, or morality, for instance.
6. I will not be specific about how a context picks out a c.b.; there are several ways to go

about it. One simple way would be to assign the adverb an index and treat backgrounds as references in the assignment function.

7. Wyner 1997 has proposed that adverbs like “wisely” in high position are predicates of facts. Under this kind of analysis, the use of such an adverb might presuppose the existence of a fact verifying the main sentence, effectively presupposing that the main sentence is true. Here I will continue to treat the apparent factivity as entailment, for reasons that will be apparent later.
8. The analysis here should be broadly compatible with non-Davidsonian theories of adverbial modification. See Wyner 1989, Landman 2001 §3.4.2, and Condorovdi and Beaver (this volume). It is not compatible with McConnell-Ginet 1982’s analysis of manner modification.
9. Pete Alrenga (p.c.) has suggested to me that this is effectively the same assumption we make about sentences like “John might fail the exam” when we hold the facts about John, the exam, and what constitutes failing constant in ideal worlds (even if a listener is not necessarily aware of all of them). In Kratzer’s ordering semantics, this would be modeled by using a circumstantial modal base that fixes the relevant facts, and a deontic ordering source that picks out the closest ideal worlds satisfying the circumstances. Note also, as pointed out to me by Donka Farkas (p.c.) that this is not a problem about counterpart theory, as the same fixing of the facts is necessary in other theories of transworld identity (e.g. Kripke 1980).
One alternative would be to quantify explicitly over properties of events, effectively moving the work into the semantics proper. This would be similar to Wyner 1994’s treatment, which quantifies over subparts of the event.
10. We could also create a higher-typed version of **illegally_{wp}**, if some adjectives that allow adverbs need to have higher types such as $\langle\langle s\langle et \rangle \rangle \langle et \rangle \rangle$.
11. This denotation is also a candidate for the meaning of *illegal*, since the types involved are the same. However, with the adjective, we run into issues of stage vs. individual level illegality that there is not space to discuss here. Note also that this coincides with Geuder 2000’s suggestion that some adjectives are not more basic than their adverbial counterpart.
12. This was pointed out to me by Marcin Morzycki (p.c.).

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