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## Conditionals in the wild

Eimear Anne Maguire

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Université  
de Paris

# UNIVERSITÉ DE PARIS

**Ecole doctorale 622 - Sciences du Langage**  
*Laboratoire de Linguistique Formelle UMR 7110*

## **Conditionals in the Wild**

Par Eimear MAGUIRE

Thèse de doctorat de Linguistique

Dirigée par Prof. Jonathan GINZBURG

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Devant un jury composé de :

*Rapporteurs :* LASSITER, Daniel / PR / Stanford University  
MAYOL, Laia / PR / Pompeu Fabra University  
*Examineurs :* BURNETT, Heather / DR / CNRS Université de Paris  
DOUVEN, Igor / DR / CNRS Université Paris 1  
*Directeur de thèse :* GINZBURG, Jonathan / PR / Université de Paris



## Declaration of Authorship

I, Eimear MAGUIRE, declare that this thesis titled, "Conditionals in the Wild" and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

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Date:

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“I went to the pet shop and the owner said he had a talking centipede for sale.

I said ‘no way, centipedes don’t talk.’ The owner promised me it was a talking centipede so I purchased it and took it home with me.

A little later in that evening I went up to its tank and said ‘alright mate, I’m just popping down the pub if you fancy a few pints?’ The centipede said nothing, I scoffed and went to the pub. The next evening I thought I’d give it another try so I went to its tank again and said ‘alright mate, I’m just popping down the pub if you fancy a few pints?’ Still absolutely no response from the centipede, so I went on my way, cursing the pet shop owner. The following evening I thought I would give it one more try, so I went over to its tank and asked ‘alright mate, I’m just popping down the pub if you fancy a few pints?’

The centipede replied ‘I heard you the first time I’m just putting my fucking shoes on’”

[https://badjokesbyjeff.tumblr.com/post/188026174995/  
i-went-to-the-pet-shop-and-the-owner-said-he-had-a](https://badjokesbyjeff.tumblr.com/post/188026174995/i-went-to-the-pet-shop-and-the-owner-said-he-had-a)



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UNIVERSITÉ DE PARIS

*Abstract*ED 622 Sciences du Langage  
Laboratoire de Linguistique Formelle - UMR 7110

Doctor of Philosophy

**Conditionals in the Wild**

by Eimear MAGUIRE

Conditionals have been a subject of great interest for decades, across a spectrum of theories, ranging from informal analysis, to formal semantics and philosophy, to the study of human reasoning. Formal semantic work has typically drawn on well-constructed problem cases, with additional support from psychological work where conditionals are used in controlled experimental stimuli.

The broad goal of this thesis is to better connect a formal model of *if*-conditionals to conditionals as they appear in spontaneous natural speech – conditionals, as it were, in the wild.

The general approach is dialogical, grounded in corpus data from spoken interaction. The formalisation uses the dialogue modelling framework KoS, which itself uses Type Theory with Records as an underlying framework. This allows for a rich, heterogeneous representation of context and the simultaneous representation of multiple linguistic levels.

The structure of the thesis is as follows. After theoretical context and introduction of the formal framework, a corpus study is presented on non-embedded *if*-clauses in spoken English across a number of settings, and their functional and formal variation. In addition to canonical conditionals (that is, an *if*-clause subordinate to an indicative clause), this includes *if*-clauses which appear to be consequentless, or which have non-clausal consequents. Noting the function of conditionals in argument and demonstrations of reasoning, they are identified as a device for expressing an argument based on a non-logical general principle (an enthymeme based on a *topos*). The felicity of conditionals via enthymeme identification, and licensing of *topos*-recognition from antecedent and consequent content, are modelled - in doing so, a formal treatment of enthymemes and *topoi* which models them as Bayesian networks is presented. Formal variation in conditionals is taken up again and *if*-clauses which lack a consequent or which have a non-clausal consequent are analysed, with a focus on metalinguistic uses on sub-utterances, which cannot be explained by an underlying canonical conditional. Lastly, a synthesis connects the implications of the previous chapters to the truth-conditional semantics of conditionals.

**Keywords:** conditionals, semantics, pragmatics, dialogue

UNIVERSITÉ DE PARIS

*Résumé*ED 622 Sciences du Langage  
Laboratoire de Linguistique Formelle - UMR 7110

Thèse de Doctorat

**Conditionals in the Wild / Les conditionnels à l'état sauvage**

par Eimear MAGUIRE

Les conditionnels sont un sujet de grand intérêt depuis des décennies, à travers un spectre de théories allant de l'analyse informelle à la sémantique formelle et à la philosophie, en passant par l'étude du raisonnement humain. Ce travail de sémantique formelle s'est typiquement appuyé sur des cas problèmes bien construits, avec un soutien supplémentaire du travail psychologique où les conditionnels sont utilisés dans des stimuli expérimentaux contrôlés.

L'objectif général de cette thèse est de mieux connecter un modèle formel de conditionnels *if* aux conditionnels tels qu'ils apparaissent dans le langage naturel spontané – des conditionnels, pour ainsi dire, à l'état sauvage.

L'approche générale est dialogique, fondée sur des données de corpus d'interaction orale. La formalisation utilise le cadre de modélisation du dialogue KoS, qui est caractérisé dans le cadre formel Type Theory with Records (TTR, « théorie des types avec enregistrements »). Cela permet une représentation riche et hétérogène du contexte et la représentation simultanée de plusieurs niveaux linguistiques.

La structure de la thèse est la suivante. Après le contexte théorique et l'introduction du cadre formel, une étude de corpus est présentée sur les clauses *if* non incorporées en anglais parlé dans un certain nombre de contextes, et sur leur variation fonctionnelle et formelle. En plus des conditionnels canoniques (c'est-à-dire une *if*-clause subordonnée à une clause indicative), ceci inclut des *if*-clauses qui semblent être sans conséquent, ou qui ont des conséquents non-clausals. Compte tenu de la fonction des conditionnels dans les arguments et les démonstrations de raisonnement, ils sont identifiés comme un dispositif permettant d'exprimer un argument fondé sur un principe général non logique (un enthymème fondé sur un topos). La félicité des conditionnels via l'identification de l'enthymème, et l'autorisation de la reconnaissance du topos à partir du contenu de l'antécédent et du conséquent, sont modélisées – ce faisant, un traitement formel des enthymèmes et des topoï qui les modélise comme des réseaux bayésiens est présenté. La variation formelle des conditionnels est ensuite reprise. Les *if*-clauses qui n'ont pas de conséquent ou qui ont un conséquent non-clausal sont analysées, en mettant l'accent sur les utilisations métalinguistiques sur les sous-utérances, qui ne peuvent pas être expliquées par un conditionnel canonique sous-jacent. Enfin, une synthèse relie les implications des chapitres précédents à la sémantique conditionnelle de vérité des conditionnels.

**Mots clefs :** conditionnels, sémantique, pragmatique, dialogue

# Résumé

## Aperçu

La sémantique formelle descend des traditions de la logique et de la philosophie du langage et, dans l'ensemble, se concentre sur les cas problèmes dans un isolement relatif, rejetant le « bruit » introduit à d'autres niveaux dans l'utilisation du langage, comme la disfluece. Cependant, un programme de recherche dialogique et interactif de sémantique formelle s'est développé au cours des dernières décennies. Cette approche a tendance à traiter directement ce qui serait autrement considéré comme un bruit de niveau inférieur dans les données. Bien que la modélisation formelle du dialogue soit toujours soucieuse de précision, elle ne peut pas s'appuyer sur des hypothèses qui rationalisent généralement la recherche sémantique formelle, et doit par exemple gérer l'interaction multipartite, l'interruption, l'erreur et la réparation, et l'incrémentalité. La modélisation de l'interaction et du dialogue est son propre domaine de recherche important.

L'analyse des conditionnels a une littérature riche et profonde dans la tradition formelle et philosophique. Cependant, la littérature sur les conditionnels a peu croisé les recherches sur le dialogue, que ce soit en termes de données empiriques d'interaction, ou de modèles dialogiques formels de contexte. Bien que leurs objectifs ne soient pas tout à fait les mêmes, les analyses doivent être complémentaires.

L'objectif général de cette thèse est d'aborder formellement les *if*-conditionnels d'anglais tels qu'ils apparaissent dans le discours naturel spontané. À son tour, une perspective dialogique devrait faire la lumière sur ce que des analyses sémantiques plus monologiques nécessitent d'être appliquées à l'éventail plus large de conditionnels tels que les locuteurs les utilisent.

Les questions motivantes de cette thèse viennent de deux directions :

- Il nous manque une description des conditionnels dans le dialogue en particulier, dans le cadre du programme de sémantique interactive - comment sont-ils utilisés et comment cela affecte-t-il l'interaction ?
- Dans l'autre sens, il existe une littérature abondante sur les conditionnels dans la tradition monologique dominante – qu'est-ce qui fonctionne le mieux pour traiter les données de parole et pour les utilisations moins considérées (mais attestées) de la construction conditionnelle *if* ?

J'utilise le cadre KoS (Ginzburg, 2012) un cadre dialogique formel, qui fournit une représentation riche et hétérogène du contexte, permettant le traitement de plusieurs aspects du discours sous une seule représentation. La base commune est traité comme la perception d'un agent individuel de l'état du dialogue et traité comme un plateau de jeu dans un état de jeu particulier, avec des champs de suivi de l'historique du conversation, des questions en discussion et des informations acceptées. KoS est caractérisé dans le cadre formel Type Theory with Records (TTR, « théorie des types avec

enregistrements », Cooper, 2005, Cooper, 2012, Cooper, 2015), un cadre de théorie des modèles issu d'une combinaison de la théorie des types de Martin-Löf et de la sémantique des situations (Barwise, 1989).

Après un aperçu des principales théories des conditionnels, et la considération de données qui dépassent leur portée actuelle, il y a trois contributions principales de la thèse.

Le rôle argumentatif des conditionnels dans le dialogue est lié à une explication plus générale de l'argument dans le dialogue sur la base de topoi, des modèles d'inférence générale. Les conditionnels sont identifiés comme introduisant un argument dans le discours, via la reconnaissance réussie de topoi connus dans le contenu d'un conditionnel, ou l'accommodation d'un nouveau topos. Ce faisant, les enthymèmes et les topoi sont caractérisés comme des réseaux minimaux, les reliant à des connaissances structurées plus généralement.

Les conditionnels métalinguistiques dans le dialogue sont liés au phénomène plus général de réparation d'énoncé. Les cas métalinguistiques sous-clausaux se distinguent des utilisations sous-clausales qui opèrent au niveau du contenu, c'est-à-dire les clauses *if* adnominales. S'appuyant sur des perspectives non formelles sur l'insubordination et l'extension fonctionnelle, elles sont analysées comme affectant des éléments de discours non-contenus. D'un point de vue dialogique, il s'agit déjà d'une action réalisée par des actions de gestion de la communication, de la même manière que les questions de correction et de clarification abordent des problèmes potentiels sous licence suite à un énoncé.

Sur la base d'analyses sémantiques formelles et d'une perspective supplémentaire à partir de travaux expérimentaux existants, je propose que pour le dialogue, un conditionnel dynamique variablement strict basé sur l'inférence peut être le plus approprié. Dans un traitement du contexte plus riche et orienté agent, l'effet de contexte de l'antécédent peut être appliqué à la fois au contenu sémantique et aux autres éléments du discours.

## Les conditionnels en usage

Les conditionnels sont généralement considérés sous leur forme canonique, une clause *if* attachée à une clause indicative. Il s'agit d'un moyen pratique de délimiter ce qui doit et ne doit pas être inclus dans les données : cependant, il exclut également toute clause *if* avec des conséquents absentes ou difficiles à définir, ou celles d'une forme différente. Pour tenir compte des conditionnels dans le dialogue, il est nécessaire d'inclure des cas plus marginaux qui sortent du cadre des comptes rendus dominante. Dans une étude de corpus, je vise explicitement à inclure des « conditionnels » où le conséquent n'était pas indicatif, était difficile à identifier ou était absent, au motif qu'ils devraient être liés à un compte rendu des *if*-conditionnels « classiques » au tout au moins.

800 instances de clauses *if* ont été extraites de la section parlée du British National Corpus. 300 provenaient de transcriptions de conversations informelles et 100 chacune de transcriptions de réunions, de séances de tutorat individuelles, de consultations médicales, de discussions avec les médias et d'entretiens. Un guide d'annotation a été développé pour aider à la cohérence, et les données ont été annotées selon la fonction, la forme et la position de leur conséquent.

La taxonomie de la fonction de dialogue pour les conditionnels est développée sur la base d'une étude pilote initiale de 300 instances, tout en profitant également des travaux antérieurs sur le corpus, et affinée par le processus de production d'un guide d'annotation pratique.

Les fonctions sont divisées en trois groupes : *Contenu*, pour fournir des informations, *Métalinguistique*, pour gérer la communication d'une certaine manière (par exemple, la politesse) et *Non assertif*, pour effectuer d'autres actes de langage. Suite à l'observation que les conditionnels non-« acte de parole » sont également utilisés pour la gestion des interactions, il devrait être possible d'identifier plusieurs fonctions pour certaines clauses *if*, et celles-ci ne sont pas toutes mutuellement exclusives, par ex. simultanément permettant une directive pour effectuer l'action de la clause *if* et fournissant une précondition informative.

Sans surprise, les usages correspondant au conditionnel indicatif hypothétique constituent la majorité des cas, et remplissent souvent une fonction d'enseignement argument/règle. Dans le reste des données, il y a d'autres utilisations qui sortent encore plus du cadre des comptes des conditionnels typiques.

La majorité des cas (80,75%) se retrouvent avec des clauses indicatives identifiables. 5% n'ont pas de conséquent identifiable spécifique. Près de la moitié des clauses *if* isolées avec une fonction de contenu d'introduction de possibilité sont utilisées comme directives, mais une partie tout aussi importante (bien que légèrement plus petite) n'avait aucune fonction identifiée au-delà de l'introduction du cas *if* dans le discours. Si le nombre brut est petit, il est néanmoins notable qu'une grande partie est utilisée pour introduire la possibilité/situation uniquement, et pas en plus pour les autres fonctions reconnues. Dans le dialogue, la clause *if* elle-même contribue à l'état d'information.

Les utilisations de couverture ou sans contenu sont identifiées lorsqu'un locuteur couvre ses connaissances ou sa précision, son choix de mots et sa pertinence. Pour garder un compte unifié des cas métalinguistiques plus difficiles qui s'appliquent à des segments autrement impropres à la combinaison avec une clause *if*, une analyse plus générale, par ex. effets de contexte, est nécessaire pour traiter ces conséquents avec un contenu inférieur au niveau de la proposition (ou de la question, ou de l'impératif), au-dessous du niveau de la proposition et au-dessous du niveau d'un acte de langage.

## Conditionnels et argumentation

Les conditionnels sont fréquemment utilisés pour l'argumentation ou l'enseignement de règles en interaction. J'identifie cela avec des arguments enthymémétiques, des arguments qui reposent sur une association avec des schémas d'inférence généraux, des topoi. Ce faisant, les topoi sont comparés à d'autres représentations de la connaissance structurée, y compris une stratégie de reconnaissance pour faire correspondre un argument enthymémétique basé sur le contenu du conditionnel avec un topos général dans la connaissance du locuteur.

Les enthymèmes sont des arguments non logiques incomplets qui sont traités comme complets. Ils sont eux-mêmes incomplets dans la mesure où pour être acceptés, ils doivent être identifiés comme une instance d'un schéma plus général des ressources de l'agent – un topos. Les topoi encodent la connaissance du monde qui se présente comme une « règle empirique » (telle que les caractéristiques typiques des groupes) et un locuteur peut considérer des topoi contradictoires comme également valables



dans différents scénarios, sans conflit vécu à moins que les deux ne soient utilisés en même temps. Les locuteurs font des arguments enthymémétique en reliant ces qui sont en surface peut être non sequiturs, mais sont facilement identifiés comme un argument en utilisant des principes acceptés. Par exemple, un locuteur pourrait dire « Allons à gauche ici, c'est un raccourci ». Cet argument invoque l'hypothèse que les itinéraires plus courts sont meilleurs et que, par conséquent, le virage à gauche étant un raccourci est une bonne raison de le prendre - mais ils pourraient également dire "c'est plus long", invoquant l'hypothèse qu'un itinéraire plus long est préférable.

Les topoi ont été proposés comme une ressource à la disposition des locuteurs, et par conséquent un moyen d'aborder le raisonnement non monotone (Breitholtz, 2014), le traitement des règles non logiques comme exprimant la nécessité, et les revendications contradictoires étant également affirmables, comme dans l'exemple ci-dessus (Breitholtz, 2014).

Les réseaux bayésiens (une combinaison de graphes acycliques dirigés et de distributions de probabilités) sont un moyen courant de coder les relations causales. Les graphiques et les réseaux peuvent exprimer un ensemble de relations plus complexe qu'une chaîne linéaire de fonctions.

Ici, les topoi et les enthymèmes sont traités comme le même type que les autres connaissances relationnelles. Sur cette base, les enthymèmes et les topoi sont formellement modélisés comme des réseaux : les topoi et les enthymèmes, comme habituellement discutés, sont des exemples minimaux, contenant seulement deux nœuds. Les enthymèmes peuvent être identifiés avec des topoi sur la base de correspondances de type entre les nœuds de l'enthymème potentiel et le topos, peuplant un enthymème sur la base de la structure du topos et du contenu spécifique de l'argument enthymémétique potentiel. Des règles de mise à jour sont fournies spécifiant l'activation des topoi dans l'état de dialogue, sur la base de l'identification de l'argument enthymémétique dans le conditionnel.

## Variation des conditionnels *if*

La sémantique formelle pour les conditionnels est principalement concernée par les conditionnels hypothétiques, avec quelques travaux supplémentaires sur les conditionnels « biscuités » et une petite quantité d'attention sur les conditionnels adnominaux. Les questions interactives autour de la gestion de la communication ne sont pas le domaine principal des comptes rendus classiques des conditionnels, bien que les conditionnels « acte de parole » ou « pertinence » aient attiré une certaine attention. Ces conditions non hypothétiques sont généralement laissées hors de portée dès le départ pour des raisons pratiques. Leurs conditions de vérité sont difficiles à juger, et il y a une forte intuition que la condition antécédente est sans rapport avec le contenu du conséquent. Comme ils semblent avoir besoin d'un traitement spécial ou d'une analyse non trivialement différente, la détermination de leur relation avec tout compte rendu de conditionnels hypothétiques est une tâche distincte, tandis que dans l'autre sens, les traitements des conditionnels d'« acte de parole » ont été critiqués comme inadaptés à une extension aux conditions hypothétiques. conditionnels (par exemple Lycan 2006). Cependant, en termes interactifs, la performance de la gestion de la communication est une fonction importante.

L'insubordination est, comme défini par Evans (2007) qui a inventé le terme, "the conventionalized main clause use of what, on prima facie grounds, appear to be formally subordinate clauses" (« l'utilisation conventionnelle de la clause principale de ce qui, à première vue, semble être des clauses formellement subordonnées »). L'exemple le plus connu en est peut-être la clause conditionnelle de la directive. Les clauses *if* insubordonnées ont été documentées avec diverses fonctions, mais cette littérature sur l'insubordination n'a pas été liée à des comptes sémantiques formels de *if*. Deux voies principales vers l'insubordination sont reconnues : l'ellipse (c'est-à-dire l'érosion progressive de la proposition principale) et l'extension (c'est-à-dire l'adaptation de la fonction de la proposition subordonnée aux éléments de discours de niveau supérieur).

Par ces voies, les conditionnels non hypothétiques et les clauses *if* isolées sont plus explicitement connectés à la majorité des travaux sémantiques formels sur les conditionnels. Je soutiens que même dans les cas de clauses complètes, les conditionnels métalinguistiques sont distincts des conditionnels hypothétiques, mais fonctionnent néanmoins fondamentalement de la même manière. Du point de vue de la modélisation de l'interaction/du dialogue, cela est identifiable comme un comportement de type réparation, et géré conformément aux stratégies existantes pour modéliser la réparation d'énoncés.

Les conditionnels métalinguistiques sub-sententielles en particulier sont un test pour les clauses conditionnelles non hypothétiques appliquées à un autre élément du discours. Étant donné que leur énoncé ciblé est inférieur au niveau de la proposition ou de l'acte de parole, ils ne peuvent pas être traités comme des conditionnels classiques avec des conditions de félicité alternatives, ce qui est une stratégie pour gérer les conditionnels métalinguistiques à conséquent clause complète. Je ré-analysé les conditionnels adnominaux conformément à l'argument précédent pour les clauses *if* appliquées aux éléments de non-contenu, et ce faisant, une distinction est maintenue entre le contenu et les effets métalinguistiques au niveau sous-clausal.

## Conditionnels dans le dialogue

Dans les chapitres précédents, les fonctionnalités interactives ont été abordées tout en restant relativement non contraignantes en ce qui concerne la sémantique sous-jacente. Les observations des chapitres précédents sont recontextualisées en référence à des analyses plus générales de sémantique conditionnelle et aux travaux expérimentaux existants sur les jugements du locuteur. Je suggère qu'un conditionnel dynamique variablement strict et trivalent est une voie productive pour le dialogue, avec un classement de « similitude » basé sur l'inférence. C'est-à-dire l'admission d'une valeur de vérité # dans le système, combinée à un conditionnel dynamique et variablement strict (suivant Starr 2014) qui (a) introduit une possibilité de discussion sur la base commun via la clause *if*, et (b) subit une évaluation basée sur les relations d'inférence.

Le conditionnel variablement strict peut être construit sur des relations inférentielles, en utilisant des réseaux causaux/équations structurelles pour déterminer le scénario initial sélectionné par l'antécédent. Lorsque la clause *if* introduit une possibilité dans le contexte, cela fournit une mise à jour générale du contexte qui peut être appliquée à des objets de discours de niveau supérieur - en particulier s'ils sont modélisés dans le même système via une représentation de contexte plus riche. Un conditionnel hypothétique n'est pas l'affirmation directe d'un lien inférentiel, mais

une affirmation de la proposition conséquente dans une possibilité où l'antécédent est mis en acte. La notion générale peut être étendue à d'autres utilisations des clauses *if* grâce à une représentation (dynamique) plus riche de l'état de dialogue et de ses éléments, notamment en distinguant le contenu sémantique, l'acte de parole identifié et l'événement de parole.

Le plateau de jeu du dialogue est relatif à l'agent : il représente le jugement d'un individu sur l'état du dialogue plutôt que d'être une sorte de vérité objective externe. En plus d'être relatifs à l'agent, les jugements sont également relatifs à la possibilité : de la même manière qu'un système de jugement reflète les jugements d'un agent spécifique, différentes normes peuvent représenter les jugements de cet agent sur différentes possibilités hypothétiques ou contrefactuelles. Dans les jugements relatifs à l'agent, un agent individuel peut porter des jugements sur des possibilités distinctes.

Le modèle de l'état de l'information dans KoS est étendu pour inclure le suivi d'autres corps d'informations, ou possibilités, permettant de multiples références de possibilité à travers les éléments du même état de dialogue. Dans la démarche, je profite de l'approche austinienne des propositions, qui permet de spécifier directement la possibilité d'évaluation d'une proposition. En utilisant ces outils, l'*if*-clause antécédent introduit une possibilité dans le contexte, ajoutant un nouveau corps d'informations pour la discussion. Comme le cadre gère le contenu sémantique et d'autres éléments de discours via la même représentation, cet effet peut être modélisé pour être utilisé sur des éléments non-contenus de l'état de dialogue. Une clause *if* peut être utilisée pour modifier la possibilité d'évaluation du matériel conséquent, que ce «conséquent» soit le contenu sémantique d'une clause matricielle ou un autre élément du discours, tel que la félicité. En plus des effets sur le contenu des directives et les réponses aux questions conditionnelles, ceci est démontré pour un effet de politesse.

## Conclusion

Il existe de nombreuses pistes immédiates pour la poursuite des travaux.

Plus urgent encore, l'étude du corpus doit être vérifiée par un accord inter-annotateur.

Le rôle d'introduction d'arguments des conditionnels a été identifié avec l'argument enthymétique (par Breitholtz 2020). Pour plus de puissance explicative, cela pourrait être lié à un travail sur les relations de discours et aux contraintes qui en résultent sur le type de relation. En ce qui concerne la représentation des topoï pour le dialogue, cela pourrait être plus détaillé pour inclure des caractéristiques reflétant l'engagement du locuteur envers la force du modèle et sa tolérance aux exceptions, pour une utilisation dans la modélisation de l'argument plus généralement. Dans la représentation actuelle, le champ probabilité était effectivement symbolique : il devrait être mis à jour avec un engagement plus significatifs avec la probabilité (ou une représentation totalement qualitative).

Lors du traitement de la variation des clauses *if*, les clauses *if* adnominales étaient acceptées comme affectant le contenu descriptif. C'est la même hypothèse que dans l'analyse préexistante, mais elle est toujours observée plutôt qu'expliquée : la raison de cet effet doit être identifiée. En reliant les clauses *si* de couverture lexicales à des éléments de discours de niveau supérieur, des indices lexicaux et contextuels plus spécifiques devraient être identifiés comme des caractéristiques permettant de

pondérer une interprétation au niveau métalinguistique plutôt qu'au niveau du contenu. L'utilisation des couvertures lexicales en général devrait également être intégrée à un traitement des pactes conceptuels.

De plus, une direction générale pour une sémantique sous-jacente appropriée pour les conditionnels dans le dialogue, en tandem avec une délimitation claire entre la valeur de vérité, le contenu et le mouvement du dialogue, a été identifiée. Cela doit être poursuivi et rendu plus concret. La perspective et les outils acquis ici ouvrent la perspective d'un récit plus large, unifiant ces usages à travers une grammaire formelle qui s'interface avec le contexte du dialogue, pour couvrir la majorité des usages conditionnels.



# List of Publications

Eimear Maguire (2019a). “Enthymemetic Conditionals”. en. In: *Proceedings of the Eighth Joint Conference on Lexical and Computational Semantics (\*SEM 2019)*. Minneapolis, Minnesota: Association for Computational Linguistics, pp. 168–177. DOI: [10.18653/v1/S19-1018](https://doi.org/10.18653/v1/S19-1018)

Eimear Maguire (2019b). “Enthymemetic Conditionals: Topoi as a guide for acceptability”. en. In: *Proceedings of the IWCS 2019 Workshop on Computing Semantics with Types, Frames and Related Structures*. Gothenburg, Sweden: Association for Computational Linguistics, pp. 65–74. DOI: [10.18653/v1/W19-1008](https://doi.org/10.18653/v1/W19-1008)

Eimear Maguire (June 2020). “‘Practical’, if that’s the word”. In: *Proceedings of the probability and meaning conference (PaM 2020)*. Gothenburg: Association for Computational Linguistics, pp. 1–7



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# List of Abbreviations

<b>BNC</b>	<b>British National Corpus</b>
<b>DGB</b>	<b>Dialogue Gameboard</b>
<b>ICE-GB</b>	<b>International Corpus of English: Great Britain</b>
<b>PUD</b>	<b>Possibilities Under Discussion</b>
<b>QUD</b>	<b>Questions Under Discussion</b>
<b>TTR</b>	<b>Type Theory with Records</b>



## Chapter 1

# Introduction

### 1.1 Introduction

Formal semantics descends from the traditions of logic and philosophy of language, and on the whole focuses on problem cases in relative isolation, discarding the ‘noise’ introduced at other levels in language use, such as disfluency. However, a dialogical, interactive research programme of formal semantics has been growing over the past few decades. This approach tends to deal directly with what would otherwise be considered lower level noise in the data. While formal modelling of dialogue is still concerned with precision, it cannot rely on assumptions that usually streamline formal semantic research, and must for example handle multi-party interaction, interruption, error and repair, and incrementality. Modelling interaction and dialogue is its own significant domain of research.

Modelling interaction and dialogue is its own significant domain of research. While formal modelling of dialogue is still concerned with precision, it cannot rely on assumptions that usually streamline formal semantic research, and must for example handle multi-party interaction, interruption, error and repair, and incrementality.

The analysis of conditionals has a rich and deep literature in the formal and philosophical tradition. It does intersect to a degree with psychological research on reasoning, and in particular judgements about truth and probability of conditionals have been recalled as evidence for or against theories which maintain similar claims, with the goal that an ideal semantic account of their truth conditions will predict the patterns found.

The literature on conditionals has not much intersected with research on dialogue, whether in terms of empirical interaction data, or formal dialogical models of context. Although their goals not entirely the same, analyses should be complementary and the accounts interlock.

The broad goal of this thesis is to address *if*-conditionals as they appear in spontaneous natural speech – conditionals, as it were, in the wild. In turn, a dialogical perspective should shed light on what semantic analyses require for application to conditionals as speakers use them.

### 1.2 Aims and Outline

The motivating questions of this thesis come from two directions:

1. We lack a treatment of conditionals in dialogue – how are they used, and how does this impact the interaction?

2. There is an extensive literature on conditionals – what works best for handling speech data, and for less regarded (but attested) uses of the *if*-conditional construction?

Overall, the aim is to connect the formal work on conditionals to the formal analysis of dialogue and interaction, and provide an appropriate treatment of conditionals for conversational data. In the other direction, the treatment of conditionals in the wider context of conversation should shed light on the applicability of competing non-dialogical analyses, in terms of their potential extension to this wider set of cases.

Although this thesis will address lesser-studied cases, attention is restricted to the conditional conjunction *if*. This is for largely practical reasons. The investigation will include additional effects on a more complex dialogical common ground than in more mainstream dynamic semantics, and cases which violate expectations about composition. The relative lack of attention to other markers is a weakness in the literature, but the attention to *if* does provide a solid basis from which to expand in these new directions. The same concern shown to *if* here should also be extended to lesser-studied markers such as *unless*.

The structure of the thesis is as follows.

First, Chapters 2 and 3 provide tools and raw materials through a combination of existing literature and empirical data.

Chapter 2 surveys major formal semantic theories of conditionals which are descended from a philosophical-logical tradition, and designed to model a specific subset of conditional usage. After this, the dialogue modelling framework is introduced.

Empirical data is gathered in Chapter 3 through a corpus study based on *if*-clauses in the spoken section of the British National Corpus. Variation in form and dialogue function are annotated, including *if*-clauses without a consequent clause or any identifiable 'consequent' matter. Unsurprisingly, uses corresponding to the hypothetical indicative conditional make up the majority of cases, but also often perform an argument/rule-teaching function. In the remainder of the data are other uses which fall further outside the scope of accounts of typical conditionals.

With these in hand, the remainder of the thesis addresses three issues for modelling conditionals in conversation – argumentation, communication management, and a general relationship to existing semantic accounts.

Conditionals contribute arguments and patterns of reasoning to an interaction. In Chapter 4 this is identified with enthymematic arguments, arguments which rely on association with general inference patterns, *topoi*. In doing so, *topoi* are likened to other representations of structured knowledge, including a recognition strategy for matching an enthymematic argument based on the conditional's content with a general *topos* in speaker knowledge.

Interactive issues around communication management are not the main purview of classic accounts of conditionals, although 'speech act' or 'relevance' conditionals have attracted a measure of attention. However, in interactive terms the performance of communication management is a significant function. From the perspective of interaction/dialogue modelling, this is identifiable as repair-like behaviour, and in Chapter 5 is handled in line with existing strategies for modelling utterance repair.

In the previous chapters, these interactive features are addressed while remaining relatively non-committal with regards to the underlying semantics. I will return to the general relationship of these dialogical functions to semantics for indicative conditionals in Chapter 6.

Lastly, Chapter 7 concludes and points to future work.





## Chapter 2

# Background

### 2.1 Introduction

This chapter will provide some background and tools for addressing conditionals in conversation. There are two obvious aspects to this: accounts of the semantics of conditionals, and the modelling of dialogue.

For terminological reasons, in Section 2.2 I will clarify some existing ways of dividing conditionals into different classes. In section 2.3, major theories of the semantics of conditionals are introduced. These focus on hypothetical conditionals (as described in Section 2.2), which have drawn the vast majority of theoretical interest: theories of other conditionals will be introduced as they arise in future chapters.

The formal dialogue framework which I will be using throughout is introduced in Section 2.4.

### 2.2 Classes of Conditionals

There are numerous ways conditionals are divided and subdivided into various types, but there are some terms in particular that I will make use of and reference.

Iatridou distinguished between hypothetical, factual, and relevance conditionals as follows (Iatridou, 1991, examples taken from):

- (1) If it rains, Peter takes the dog out.
- (2) A: Bill is very unhappy here.  
B: If he is so unhappy he should leave.
- (3) If you're thirsty, there is a beer in the fridge.

Similar typings are echoed elsewhere, such as the division of conditionals across content, epistemic, speech act domains by Sweetser (1990). Hypothetical conditionals are what is usually thought of as a conditional, an *if*-clause indicating circumstances in which the consequent circumstance is true. I will use the terms hypothetical and content conditional throughout.

Factual (or premise) conditionals echo established information in their antecedent, and were originally treated as distinct because of this non-hypotheticality, the requirement that someone believe the antecedent case to be true.

Relevance (or speech act, or biscuit) conditionals cover a wide range of conditionals which intuitively do not affect the content of the consequent in the same way as hypothetical conditionals. Where (1) can be paraphrased as "in any circumstance where it rains, Peter takes the dog out", "in any circumstance where you're thirsty, there is a

beer in the fridge" would be an misleading paraphrase for (3). In general, I will use *biscuit conditionals* as a more analysis-neutral general term for the speech act/relevance conditionals, a convention originating in the following well-cited example:

- (4) There are biscuits on the sideboard if you want them. (Austin, 1956)

Hypothetical conditionals themselves can be split into indicative (5a) and ‘subjunctive’ (5b) conditionals, which in English include additional past tense-aspect marking. Nevertheless, *subjunctive* remains the standard term.

- (5) a. If Oswald didn’t shoot Kennedy, somebody else did.  
b. If Oswald hadn’t shot Kennedy, somebody else would have.

With only the indicative-subjunctive marking to distinguish them, the first is generally judged true, but the second false. Where the *if*-case of the indicative appears to address potential extension of our beliefs, the *if*-case of the subjunctive appears to indicate a circumstance involving revision.

Without any other qualifier, a “conditional” is an indicative hypothetical conditional. This is standard – however, I do want to recognise from the beginning that this is limited, and even coverage of both content conditional groups via inclusion of subjunctive conditionals is non-comprehensive.

## 2.3 Theories of Conditionals

Given here is an overview of some main semantics for conditionals: the material conditional, strict and variably strict conditionals, the latter including the *if*-clause as a scope restrictor in particular, and trivalent and non-truth-valued alternatives.

### 2.3.1 The Material Conditional

The material conditional is the conditional connective of propositional logic (as in table 2.1), and struggles more or less immediately when used as an account for natural language. Part of the reason it is still worth discussing is due to Gibbard’s proof that a bivalent conditional will reduce to the MC if that conditional is a binary operator. We cannot appreciate why this casts such a shadow without understanding why the MC is generally considered undesirable in the first place. The material conditional is truth-functional: it is false if its antecedent true and its consequent false, and true in all other cases – meaning it is true in all cases where the antecedent is false. Instances where this appears incorrect (or counter-intuitive at best) are to be explained as the violation of additional pragmatic constraints.

Rejection of the material conditional is not universal: Abbott (2004) argues that while there are certainly problems with a MC semantics, the same must be said for any

		<i>q</i>	
		T	F
<i>p</i>	T	T	F
	F	T	T

TABLE 2.1: Truth table for the material conditional.

other analysis, and the MC is no less deserving than these others of having its flaws addressed, rather than being dismissed as unworkable. Historically, it was also considered the semantics of the indicative conditional by Grice (1989) and Lewis (1987).

The variations between material conditional accounts lie in their pragmatics. Jackson associates the conditional with a conventional implicature: as well as the truth-valued conditional proposition  $p \supset q$ , the conditional “If  $p$ ,  $q$ ” indicates that a speaker believes that this conditional proposition is ‘robust’ with respect to the antecedent. This means the speaker believes that  $P(q|p)$  (the conditional probability of  $q$  given  $p$ ) is high, which in turn is sufficient for  $P(p \supset q)$  being high. On the flip side, if the addressee believes that  $P(q|p)$  is low, then this leads to the beliefs that  $P(\neg q|p)$  and  $P(p \supset \neg q)$  are high. This predicts that rejecting *if  $p$ ,  $q$*  and accepting *if  $p$ ,  $\neg q$*  are likely to go hand in hand (Jackson, 1998, p. 21-2), even independent of the direct relationship between the truth/falsity of their constituents. Thus whether we accept a conditional or not is down to more than its truth conditions: believing that  $P(q|p)$  is low will clash with the robustness implicature, leading to rejection or disagreement even if at the semantic level  $p \supset q$  is true. In practice however, a false antecedent in truth judgement tasks does not trivially lead to the judgement of a conditional as true.

Counterfactual conditionals, i.e. those with a false antecedent, are trivially true under a material conditional account. As a result, one consequence of a material conditional account for indicative conditionals is that subjunctive conditionals must be handled in a different manner. Lewis (1973) is an especially prominent example of this, proposing a variably strict conditional (see next sections) for counterfactual conditionals, while maintaining the material conditional for indicatives.

Distinct rather than unified semantics for indicative and subjunctive conditionals is not universally considered a negative – Bennett (2003, p. 369), although not in favour of a material conditional analysis, criticises strongly unified accounts as oversimplified, and masking a distinction that is there to be captured in the first place. While not a fatal flaw however, on an intuitive level it is very counter-intuitive about the notion that the ‘subjunctive’ marking indicates a different semantics entirely. Because it is simply truth functional, it also does not offer more general features to extend the account to *if*-conditionals without propositional consequents. Addressing only a subset of even hypothetical conditionals then, makes it quite limited.

Lastly, the material conditional additionally validates patterns of inference that strongly contradict intuitions about what is or is not correct. in particular the following

- **Falsity of the antecedent guarantees truth of the conditional:**

$\neg p$ . Therefore, *if  $p$ , then  $q$*  is true.

The only case in which the material conditional is not true is the case where its antecedent is true but its consequent is false. As long the antecedent is false, then that case cannot be fulfilled, and the conditional must be true.

- **Falsity of the conditional guarantees truth of the antecedent:**

$\neg(\textit{if } p, \textit{ then } q)$ . Therefore,  $p$  and  $\neg q$ .

This is the previous problem from the other direction. If the conditional is false, then it must be that the antecedent is true and the consequent is false. Not only that, but asserting that *if  $p$ , then  $q$*  is false and asserting  $p$  and  $\neg q$  as true should be equivalent.

If the semantics follows the material conditional, then both of these are valid, and it falls to pragmatics to explain why we find them unacceptable.

### 2.3.2 The Strict Conditional

C.I. Lewis (1914) introduced a modal analysis to better handle the failures of the material conditional through *strict implication*. The strict conditional is true provided the material conditional is *necessarily* true. As a result, a false antecedent no longer automatically verifies a conditional: if there is any possible where the antecedent is true but the consequent is not, the conditional is false. The conditional proposition does have a truth value, but it is no longer merely a function of the truth values of the antecedent and consequent, as it is under a material conditional analysis.

This does come with its own questionable predictions, however. For example, where *if p, q* is evaluated as true, *if p ∧ r, q* with a strengthened antecedent is also true under a strict conditional analysis, since  $p \wedge r$  is a subset of the  $p$  cases – and we have already confirmed that *if p, q* is true.

There has been some exploration of whether a strict analysis can work with the right treatment of context (Fintel, 2001; Gillies, 2007). A *variably* strict semantics however, is the dominant solution to these problems.

### 2.3.3 The Variably Strict Conditional

The variably strict conditional, also known as the Lewis-Stalnaker conditional, adds flexibility by limiting the conditional's claim to necessary truth of the consequent in the antecedent case, in the most similar antecedent worlds. As a result, the strict conditional's problem with strengthening the antecedent is avoided. In some context, the most similar  $p$  worlds may not include the most similar worlds where both  $p$  and  $r$ , and so there is no contradiction between saying *if p, q* is true and *if p ∧ r, q* is false.

David Lewis (1973) put forward a variably strict semantics for counterfactuals, which was more or simultaneously proposed by Stalnaker (1968; 1975) who included indicative conditionals, dropping the material conditional aspect entirely.

The example here is based on Stalnaker's proposal as described in Stalnaker (1968) and Stalnaker (1975). Lewis' version differs in not making the Uniqueness Assumption, the assumption that for an antecedent and world of evaluation, there will be a unique most similar antecedent world (nor the weaker Limit Assumption, that for an antecedent and world of evaluation, there will *be* a set of maximally similar antecedent worlds).

Conceptually, a conditional is evaluated in line with the Ramsey test (Ramsey, 1929), by adding the antecedent to beliefs, making minimal adjustments to maintain consistency if necessary, and evaluating the consequent in this hypothetical case (Stalnaker, 1968, p. 102). Practically, this is done via a possible worlds semantics. For a proposition  $p$  and a possible world  $w$  (i.e. the world of evaluation), a selection function  $f$  returns another possible world  $w'$  in which  $p$  is true, but is otherwise as similar to  $w$  as possible. If  $q$  is true in  $w'$ , then *if p, q* is true.

- (6)  $p \rightarrow q$  is true(/false) in world  $w$  if  $q$  is true(/false) in  $w'$ , where  $w' = f(p, w)$ .  
(based on Stalnaker (1968, p. 103))

In the context of a communicative situation some background information is being presupposed, represented by the context set,  $C$ , the set of possible that the background

information does not rule out. If a proposition is compatible with the context set, then it is true in some of the possibilities in the context set.

The selection function needs some way to characterise minimal difference. Stalnaker makes the uniqueness assumption, that for any antecedent  $p$  and world  $w$ , for  $f(p, w)$  there will be a single most similar  $w'$ . The features relevant for similarity will vary by context, and Stalnaker leaves this to the pragmatic level. The indicative-subjunctive distinction arises from a pragmatic constraint associated with indicative conditionals: if  $w$  is in the context set, then  $f(p, w)$  should be in the context set too. In other words, the antecedent should be a situation which is still potentially possible.

- (7) If  $w \in C$  then  $f(p, w) \in C$ .

The marking on a subjunctive conditional indicates that this constraint can be dropped, and  $f(p, w)$  might not be in the context set, even if  $w$  is – that is, the antecedent may be false.

The variably strict conditional gets Sobel sequences right, which the strict conditional does not. However, the variably strict conditional predicts that reverse Sobel sequences should be equally acceptable, which is not the case:

- (8) *Sobel sequence*: If the USA threw its weapons into the sea tomorrow, there would be war; but if all the nuclear powers threw their weapons into the sea tomorrow, there would be peace.
- (9) *Reverse Sobel sequence*: If all the nuclear powers threw their weapons into the sea tomorrow, there would be peace; # but if the USA threw its weapons into the sea tomorrow, there would be war.

Starr (2014) proposes accounting for this with a more dynamic version of the variably strict conditional, which has an additional effect on the context. His proposal is not just dynamic in the sense of the *if*-clause creating a temporary context in which to evaluate the consequent, but adds this alternative context as an available body of information in the context. The infelicity of the reverse Sobel sequence is then attributed to being an inappropriate continuation of the discussion of the body of information introduced by the first conditional in the sequence.

In unifying indicative and subjunctive conditionals, Stalnaker (1975) distinguishes between them according to whether the antecedent was necessarily part of the context set – what is believed by the speakers about the world. An indicative conditional indicates that the antecedent is still a possibility in the real world, a subjunctive indicates that it may not be. Abbott (2004) criticises that this makes an insufficient distinction between the two types. There is potentially more at stake in the indicative/subjunctive distinction than openness to the truth of the antecedent: there should be a distinction between making a statement about the actual world (or world of reference) with an indicative, and making a statement about a hypothetical state of affairs with a subjunctive, regardless of whether the antecedent is potentially true. The issue isn't whether the antecedent case is possible in the real world or not, but whether a speaker marks that they are discussing about the real world or a hypothetical one.

### 2.3.4 Variably Strict – by Restriction

Lewis (1975) considered conditionals involving adverbial quantifiers, as follows:

- (10) a. If it's cloudy, I pack an umbrella

- b. Usually, if it's cloudy, I pack an umbrella

What (10b) should express is that when it is cloudy, the speaker usually (though not always) packs their umbrella. The umbrella-packing should be usual relative to the cases where the weather is cloudy, not that “If it's cloudy, I pack an umbrella” is usual in general.

- (11) a. USUALLY (if it's cloudy, I pack an umbrella) ✗  
 b. (USUALLY: it's cloudy) (I pack an umbrella) ✓

In the collection of adverbs considered,<sup>1</sup> no single interpretation of *if* as a binary connective will have a result equivalent to 11b for all of the groups. His proposed solution was that *if* act as a restrictor in these cases: the adverbial quantifier applies to the main clause, with the *if*-clause already restricting its scope to the antecedent case.

Although originally intended as an exception, Kratzer (1986) generalised *if* as a scope restrictor to all conditionals. Rather than *if* itself as an operator, this treats the *if*-clause as designating a scope restriction for some other operator, which is not contributed by the *if*-clause itself. When no overt operator appears, as in (10a), we must a covert operator must be present.

Following Kratzer's analysis for the semantics of modals, the interpretation of a modal depends on two conversational backgrounds, functions from worlds to sets of propositions true in those worlds. The first is the modal base  $f$ , a background of consistent information. The second is the ordering source  $g$ , a standard by which possible worlds can be evaluated, such as normalcy, successful goal-fulfilment or lawfulness. Together, they provide a context set and ordering for the variably strict conditional.

$W$  is the set of worlds,  $f(w)$  the set of propositions true in world  $w$ , and  $\cap f(w)$  all of the  $W$  worlds in which those  $w$ -world propositions are true. The ordering source then determines the  $\cap f(w)$  worlds which come closest to meeting its ideal (i.e.  $\cap f(w)$  worlds with the most true  $g(w)$  propositions). The *if*-clause in a conditional further restricts the modal base for some modal in the consequent clause. The worlds evaluated by the ordering source have then already been restricted to those satisfying the *if*-case.

- (12)  $\llbracket \text{if } p, q \rrbracket^{f,g} = \llbracket q \rrbracket^{f,g}$ , where for all  $w \in W$ ,  $f^*(w) = f(w) \cup \{\llbracket p \rrbracket^{f,g}\}$ .  
 (based on Kratzer (2012, p. 94))

The the first and second examples below are very alike as a result: in the second it is as if the consequent  $q$  had been uttered in a context where the antecedent  $p$  was already part of the background information/modal base.

- (13) a. “John might be home already.”  
 b. MIGHT (home)  
 (14) a. “If he left early, John might be home already.”  
 b. (MIGHT: early) (home)

Where there appears to be no modal operator present, a covert necessity modal operator is posed:

- (15) a. “If he left early, John is home already.”

<sup>1</sup>Six groups: (1) Always, invariably, universally, without exception (2) Sometimes, occasionally, [once] (3) Never (4) Usually, mostly, generally, almost always, with few exceptions, [ordinarily], [normally] (5) Often, frequently, commonly (6) Seldom, infrequently, rarely, almost never (Lewis, 1975, p. 3)

## b. (MUST: early) (home)

The *if*-clause adds nothing in itself: it marks content (the antecedent) with which to update a parameter used by an already-existing operator – overt MIGHT in the first two examples, and of covert MUST in the third.

The intuitive disadvantage of the restrictor analysis is that the cases which appeared to be simplest are now the more complex, requiring the presence of a covert operator to be targeted for restriction. For these ‘bare’ conditionals, the element on which the whole structure hinges is invisible. In Kratzer’s own theory, a covert operator is posited when needed. Alternatively, Kaufmann (2005) proposes that a covert modal is always present for tensed sentences, in which case the introduction of an *if*-clause does not require alteration of the original consequent-clause beyond adding the restriction to the modal’s scope. Misgivings about the required treatment of bare conditionals are strong enough to motivate a continued search for an alternative explanation, as in the recent work on characterising an adequate binary operator, mentioned above.

## 2.3.5 Trivalent

All of the accounts above have been bivalent, with semantics which ultimately evaluate to T or F. Finetti suggested a trivalent logic for ‘conditional events’ (*événements subordonnés*), with a TF value only where an additional condition (i.e. an antecedent) has been fulfilled, similar to a conditional bet. As an example, suppose there will be a two-person race between *Red* and *Blue*. *A* and *B* make a bet: *A* bets that *Blue* will win and *B* bets that *Red* will win. Who has won the bet if the race is called off? One reasonable response is that the bet was conditional on the race taking place, and with the race being cancelled, the wager is void. In the same vein, the de Finetti trivalent conditional is neither true nor false unless the antecedent is true, in which case it has the value of the consequent (whether true, false, or itself #).

Like the material conditional, the trivalent conditional is truth-functional, and can be described via truth table. The potential for a #-valued antecedent arises naturally from adopting a trivalent system. De Finetti treats the third value as less than true, grouping #-antecedent conditionals with cases where the antecedent is confirmed false, so that the conditional is only potentially TF-valued where the antecedent is true. Cooper (1968) and Cantwell (2008) later treat # as more than false, grouping #= and T-antecedent conditionals so that a conditional is potentially TF-valued so long as its antecedent is not false. See Egré, Rossi, and Sprenger (2019) for an extended discussion of the consequences of some logics based on these differences.

		<i>q</i>		
		T	#	F
T		T	#	F
<i>p</i>	#	#	#	#
F		#	#	#

		<i>q</i>		
		T	#	F
T		T	#	F
<i>p</i>	#	T	#	F
F		#	#	#

TABLE 2.2: Truth tables for the de Finetti (left) and Cooper-Cantwell (right) trivalent conditionals.



In addition to its intuitive appeal, trivalency also appears to solve some potential problems with bivalent accounts as identified by Lewis (1976) and Gibbard (1981).

In brief, Lewis (1976) provided a difficulty for bivalent, propositional conditionals when it comes to probability. Stalnaker (1970b) argued that the probability that a conditional is true is equal to the probability that the consequent is true, given (that is,  $P(\text{if } p, q) = P(q \mid p)$ ). Although intuitively appealing, Lewis found that the assumptions required for a bivalent, propositional conditional operator to maintain the Equation lead to bizarre trivial results, e.g. the probability of the conditional being equal to the probability of the consequent, so long as the probability of that consequent is neither 0 nor 1.

Lewis suggested some potential ways out while keeping the Equation. Indicative conditionals may be non-truth-valued, a departure which opens an enormous divide between them and other propositional material. They may be truth-functional and bivalent, with a conditional operator equivalent to the material conditional: this is Lewis' own preferred solution, with additional constraints on assertability following Grice (1967). They may also be truth-functional and *trivalent*. Lassiter (2019) shows that alternative proofs for Lewis' problem can also be avoided by trivalency.

The second is a proof due to Gibbard (1981) that given a few additional background assumptions,<sup>2</sup> a conditional operator  $\rightarrow$  reduces to the material conditional if it validates the Law of Import-Export, that  $p \rightarrow (q \rightarrow r)$  and  $(p \wedge q) \rightarrow r$  are logically equivalent. Unless a binary account defies one of these three conditions, it reduces to the material conditional. A bivalent propositional account must consequently (a) embrace the truth conditions of the material conditional, or (b) avoid an assumption required for the proof, e.g. by no longer validating import-export (the Lewis-Stalnaker solution). Egré, Rossi, and Sprenger (2020) show that a truth-functional trivalent conditional is an alternative solution for avoiding Gibbard's result.

A trivalent conditional then seems to appeal on multiple fronts: intuitive, empirical, and formal.

## 2.4 Language in Interaction

### 2.4.1 Framework Underpinnings

I will be using the KoS dialogue framework (Ginzburg, 2012). The common ground is handled as an individual agent's perception of the dialogue state. The dialogue state is treated as a gameboard, with fields tracking conversation history (*Moves*), questions under discussion (*QUID*), and accepted information (*Facts*). KoS is characterised in the formal framework Type Theory with Records (TTR) (Cooper, 2005; Cooper, 2012; Cooper and Ginzburg, 2015), and provides a rich, heterogeneous representation of context, allowing the treatment of multiple aspects of discourse under a single representation.

TTR is a model-theoretic framework descended from a combination of Martin-Löf Type Theory theory and situation semantics (Barwise, 1989). A central concept in TTR is the judgement of objects as being of some type. If  $a$  is judged to be of type  $T$ , this is written as  $a : T$ . If an object  $a$  is judged of type  $T$ , then it is a witness for that type. Several of these judgements, or requirements for judgements, can be collected

<sup>2</sup>(a) That it is at least as strong as the material conditional, i.e.  $p \rightarrow q$  is false when  $p$  is true and  $q$  is false; (b) That it is supraclassical, i.e. that it logically true whenever  $q$  is a logical consequence of  $p$ .

in structured objects. These records and record types are effectively sets of label-value or label-type pairs. In a record type, fields consist of a label and type, while fields in a record consist of a label and a value. For a record  $r$  to be of a record type  $RecType$ , it must have fields with the labels specified in  $RecType$ , and the values in those fields in  $r$  must be the types specified by the equivalently labelled fields in  $RecType$ . For example, the records in (16) and (17) are both of the record type (18), provided that  $x$  is of type  $T_1$ . The type of a field need not be stand-alone either: it may also be constructed from a predicate and arguments, like the field  $d$  in (19).

$$\begin{array}{lll}
 (16) \quad [a = x] & (18) \quad [a : T_1] & (20) \quad \begin{bmatrix} a : T_1 \\ b : T_2 \end{bmatrix} \\
 (17) \quad \begin{bmatrix} a = x \\ b = y \\ c = z \end{bmatrix} & (19) \quad \begin{bmatrix} a : T_1 \\ d : p(a) \end{bmatrix} & (21) \quad \begin{bmatrix} a : T_1 \\ c : T_3 \end{bmatrix}
 \end{array}$$

There also exist sub- and super-type relations between types. One record type is a subtype of another if it is a more specified version of it. This means that it has at least the same fields as the supertype, whose types are the same type or subtypes of the equivalent fields in the supertype. For example, (20) and (21) are different types, but are both subtypes of the more general (18). A record of type (20) is not necessarily of type (21), but will be of type (18). Depending on whether  $x : T_1$ ,  $y : T_2$  and  $z : T_3$ , the record in (17) will be of all three types.

Judgements are relative to some type system – e.g. an agent’s personal understanding of categories and types. This will not be returned to until the end of Chapter 5, but it can be mentioned now in preparation.

Relevant details about KoS are given in the next subsection.

### 2.4.2 Modelling Dialogue

An agent’s information state has two components: the public dialogue gameboard (DGB), their understanding of the current common ground, and their private resources (e.g. pre-existing world-knowledge, goals, lexicon), which have not necessarily been introduced to the common ground of the interaction. While there may be some reference to an agent’s resources, in general I will only deal with the dialogue gameboard. The basic dialogue gameboard setup is as follows:

$$(22) \quad \begin{bmatrix} \text{spkr} & : \text{IND} \\ \text{addr} & : \text{IND} \\ \text{utt-time} & : \text{TIME} \\ \text{Pending} & : \text{List}(\text{LocProp}) \\ \text{Moves} & : \text{List}(\text{LocProp}) \\ \text{QUD} & : \text{POSet}(\text{Question}) \\ \text{Facts} & : \text{Set}(\text{Prop}) \end{bmatrix}$$

In a dialogue state, the agent recognises the speaker, addressee, and the current time-point. Currently ungrounded utterances are tracked in *Pending* while the conversation history of grounded utterances is tracked in *Moves*. The information that has been mutually established in the conversation, e.g. via accepted assertions, accumulates as a set of propositions in *Facts*. Properly, members of *QUD* are slightly more complex in

KoS, and as well as the question itself include direct reference to a focus-establishing constituent. However, I will deal with the questions directly, and leave this aside.

For the ordered fields, the maximal (i.e. most recent) elements can be referred to in shorthand as *MaxPending* and *MaxQUD* for the maximal member of *Pending* and the current maximal question under discussion, and as *LatestMove* for the most recently grounded dialogue move.

Propositions are modelled as Austinian propositions, whose truth is dependent on whether a particular situation is of a situation type (true if the situation is indeed of that type, and false if not). The *Prop* type contains two fields, as shown in (23):

(23) An Austinian proposition *Prop*:

$$\left[ \begin{array}{ll} \text{sit} & : \text{Rec} \\ \text{sit-type} & : \text{RecType} \end{array} \right]$$

For a *Prop*  $p$  where  $p.\text{sit} : p.\text{sit-type}$ ,  $p$  is true.

A parsed speech event is treated as a Locutionary Proposition (*LocProp*) a subtype of Austinian proposition dependent on matching a speech event to an utterance type. The utterance type may be composed using the agent's linguistic resources of lexicon, phrase and clause types, etc.

Conversational moves, or speech acts, are treated as recognition that the situation is such that a speaker has made an assertion, asked a question, etc. Locutionary propositions identified as Moves in the interaction will have illocutionary propositions as their content. For example, where a speaker says "Jane runs.", the situation can be judged as the speaker asserting the proposition *Jane-runs*. In terms of (24), illocutionary relation  $R$  is *Assert*, and the semantic object  $a$  the proposition containing *run(Jane)*, produced by parsing "Jane runs".

(24) *IllocProp*:

$$\left[ \begin{array}{ll} \text{spkr} & : \text{IND} \\ \text{addr} & : \text{IND} \\ a & : \text{AbstSemObj} \\ R & : \text{IllocRel} \\ \text{sit} & : \text{Rec} \\ \text{sit-type} = [c : R(\text{spkr}, \text{addr}, a)] & : \text{RecType} \end{array} \right]$$

(25) *Assert*(spkr, addr, *Jane-runs*)

Following Ginzburg and Sag (2000) and Ginzburg (2012), directives do not have propositions as their denotata: they cannot be reasonably evaluated as being true or false, only fulfilled or unfulfilled. Instead, they denote an *Outcome* as shown in (26), something similar to a proposition, but with the temporal argument of the situation type abstracted. Whether an outcome is fulfilled depends on the existence of a subsequent situation that meets the criteria once that temporal argument is filled, as characterised in (27).

(26) An *Outcome*:

$$\left[ \begin{array}{ll} \text{sit} & : \text{Rec} \\ \text{irr-sit-type} & : (r : [t : \text{Time}])\text{RecType} \end{array} \right]$$

$$(27) \text{ A Fulfiller for some outcome } o = \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = p_0 \end{array} \right]$$

$$\left[ \begin{array}{l} s_1 : \text{Rec} \\ \text{fulfil-time} : \text{Time} \\ c : \text{anterior}(s_0, s_1) \\ p = \left[ \begin{array}{l} \text{sit} = s_1 \\ \text{sit-type} = p_0(\text{fulfil-time}) \end{array} \right] : \text{TrueProp} \end{array} \right]$$

Acceptance of a directive move is treated as adding an item onto the directee's to-do-list. This handling of directive actions is based on Beyssade and Marandin (2006), where one aspect of the common ground is a field TO-DO, itself comprised of lists for each interlocutor with the Outcomes they are committed to fulfilling – commands accepted, promises made, etc.

$$(28) \left[ \begin{array}{l} \text{spkr} : \text{IND} \\ \text{addr} : \text{IND} \\ \text{LatestMove} = \text{Comm}(\text{spkr}, \text{addr}, o_1) : \text{LocProp} \\ \text{TO-DO.addr} = [o_1 | \dots] : \text{List}(\text{Outcome}) \end{array} \right]$$

Questions are treated as propositional abstracts, functions mapping missing content into the proposition. For example, polar questions are characterised as in a simplified<sup>3</sup> example (29), as all they require is confirmation or denial of the proposition. An affirmative answer will result in (29b).

$$(29) \text{ a. Does Jane run?}$$

$$\left( r : [ ] \right) \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} j : \text{IND} \\ c : \text{run}(j) \end{array} \right] \end{array} \right]$$

$$\text{b. Yes.}$$

$$\left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} j : \text{IND} \\ c : \text{run}(j) \end{array} \right] \end{array} \right]$$

More complex questions are functions from more specific records. The question (30a) is a function from records which contain some individual. A short answer where the individual  $x$  is *Jane* will result in (30b)

$$(30) \text{ a. Who runs?}$$

$$\left( r : [x : \text{IND}] \right) \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = [c : \text{run}(r.x)] \end{array} \right]$$

$$\text{b. Jane.}$$

$$\left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = [c : \text{run}(j)] \end{array} \right]$$

<sup>3</sup>Simplified in the sense of avoiding dealing with e.g. tense, rather than simplifying the nature of the question itself.

## 2.5 Conclusion

Truth-functional semantics are perhaps *too* self-sufficient: because they do not need anything more than access to truth-values, they do not require introduction of a more complex process which can be extended to address other cases. However, only accounting for truth-evaluation in this manner is of very limited scope in the wider interactive context. While not incompatible with a more complex analysis, a truth-functional analysis in itself does not provide a generalisable account, and relies on having a consequent which is truth-valued (or valued at # – in either case, effectively propositional). An underlying truth-functional semantics will still need a relationship to some other process which can scale up to consequents other than an indicative clause and to uses other than as a hypothetical conditional, even if for indicative conditionals it reproduces a trivalent truth table, and from that perspective seems like overkill.

The variably strict accounts do have a more generalisable process, as they use the common ground to determine the truth value of the conditional – in particular the unified accounts which share this process across both indicative and subjunctive conditionals. The restrictor-*if* analysis, is more compositionally explicit, and offers a concrete proposal by identifying the *if*-clause as the restrictor of another operator. If other *if*-clause uses work similarly, it should be possible to extend it. This involves a covert element for the ‘bare’ base case, but nevertheless provides a more specific strategy which may be generalisable. Approaches to conditionals in dynamic semantics (whether variably strict or not) are more adaptable than a truth table, using a temporary context update. Even so, representation of common ground is limited to which propositions are currently established as true, necessary, false, etc. This is only one component of context from the perspective of interaction modelling, and any such effect will need to be further defined.

Ultimately, all of these conditional accounts are designed to determine the truth for a propositional antecedent-consequent pair. Descending from the logical-philosophical tradition, their roots lie in trying to define a model for what makes a conditional true. As flagged at the beginning, this addresses only a subset of what the *if*-conditional construction at large is used to do. Existing extensions and alternatives to deal with other cases will be discussed in Chapter 5, when focusing on communication management issues. Due to their simplicity, truth functional accounts have no need for anything other than the truth-values themselves. When just dealing with truth evaluation, this is appealing and simple. However, it does mean nothing is available to extend to other uses: the consequent and the conditional itself must themselves be truth-valued. A fundamentally truth-functional analysis will have to be replicated by a more complex account in order to be generalised. Variably strict analyses are more complex, evaluating the consequent on the basis of a context in which the antecedent case is true. This is a more generalisable procedure, but all on level of larger scale context updates. Within this, the restrictor account is more specific in how this is implemented, attributing it to restriction of a contextual parameter for an operator. As a result, it is applicable to non-propositional or even non-clausal elements, but at the cost of the presence of an operator for the *if*-clause to act on, for whatever element it affects.

In the next chapter, we will see some natural speech data, and consider what amongst it lies outside what these accounts were designed to explain.

## Chapter 3

# Conditionals in Use

### 3.1 Introduction

Before attempting to address the variation that exists in English conditionals, we need a better understanding of what that is. Conditionals in corpora are usually considered in their 'canonical' form, an *if*-clause adjoined to an indicative clause. This is a practical means of clearly delineating what should and should not be included in the data: however, it also immediately excludes any *if*-clauses with absent or difficult to define consequents, or those of a different form. In this study, I explicitly aimed to include 'conditionals' where the consequent was non-indicative, difficult to identify, or absent, on the grounds that while not entirely the same thing, these cases are hardly unrelated, and should be linked to any account of traditional *if*-conditionals at the very least.

This chapter reports a corpus study on the functions of *if*-clauses in dialogue, and a taxonomy of their function. First, an overview is provided of existing corpus studies related to conditionals, and motivation for the current investigation in that context. A taxonomy of functions is described based on an initial pilot study. The main corpus study itself is then reported, first reporting and discussing the quantitative results, followed by additional observations made on the basis of the corpus data.

As a note, reference will be frequently made to "*if*-clauses" rather than "conditionals": this is due to the practical focus on the *if*-clause itself, allowing us to include cases where the consequent is unclear or absent, or can be identified but isn't obviously clausal. *If*-clauses embedded as indirect questions, as in "I wonder if...", are still not included here.

### 3.2 Existing Corpus Studies

Corpus studies of English *if*-conditionals do exist, but most are pedagogical in focus.<sup>1</sup> These pedagogically-motivated studies compare the range of tense-aspect and modal combinations in antecedent and consequent clauses with those presented in learning materials, inevitably providing evidence that the small selection being taught to learners fails to cover a major portion of naturally occurring material. However, these do not provide us with anything beyond a catalogue of verb-form and modal combinations. Ferguson, 2001, while illustrating the variety of verb forms in specifically medical interactions and texts for similar pedagogical reasons, also examines the functions

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<sup>1</sup>e.g.: Novogradec, 2009, Phoocharoensil, 2014, Bujak, 2014

of a small number of *if*-conditionals in doctor-patient interaction. Although a preliminary categorisation of the functions of the sample is carried out,<sup>2</sup> the function of a good chunk of the data is still left in an 'other' category (11 out of 77 instances).

From a non-pedagogical perspective, Ford and Thompson (1986) carried out a study on the *if*-conditional's relation to context, later followed up by a smaller study on its 'communicative role' Ford (1997). These give us a deliberate look at the conditional in spoken contexts, and evidence of their communicative function. The first study uses both written and transcribed spoken data (from meetings and lectures), and identified four relations between the *if*-clause, the consequent and the preceding context in terms of topic: the conditional being used to (i) explore options provided by the context, (ii) illustrate a generalisation, (iii) repeat an accepted assumption or (iv) provide contrast with an assumption or suggestion.

The second (much smaller) study explores functions in dialogue specifically, focusing on the use of conditionals to manage interactional issues. Although the sample size was too small (at 55 instances) to attempt deriving a comprehensive categorisation, Ford grouped them into five 'clusters' of function: (i) displaying the relevance of the current turn, (ii) displaying new or contrasting understandings, (iii) 'being agreeable', (iv) hedging true but 'interactionally difficult' information, and (v) proposing addressee action. Ford additionally found that these functions were not restricted to so-called 'speech act' conditionals<sup>3</sup>, conditionals in which the *if*-clause is considered to restrict the speech act of the consequent, rather than its actual content, e.g. "If you don't mind me saying so...". A conditional having an *if*-clause that is informative with regard to the consequent, rather than being directly metalinguistic, does not preclude it from being used to manage interpersonal aspects of the interaction, e.g. by avoiding outright assertion of undesirable antecedent content.

Declerck and Reed, 2001 must be noted for developing a data-motivated set of fine-grained typologies across various levels, although this work not exactly a 'corpus study', since it provides a classification without reporting an attempt to consistently apply it across a dataset. Though lacking a comprehensive overview, theirs is by far the most wide-ranging attempt at assembling differently-motivated but detailed classifications in a single place. The categorisations fall into two groups: according to possible world status, and according to discourse function. With regard to possible world status (of the antecedent), they are described according to that status, the use of tense (by antecedent factual status), the presence of marked modality (a modal auxiliary, or the tense marking of 'subjunctive' conditionals – again by antecedent factual status), the relation of the pedagogical tense-aspect patterns to degree of likelihood, and the potential relationships between the "theoretical" world of the conditional and the actual world. With regard to 'discourse function', they are split into those with 'case-specifying' and 'rhetorical' antecedents, and classified according to the antecedent-consequent relation within that. Attention is also given to varying syntactic marking for conditionals, and different connecting devices used<sup>4</sup>.

<sup>2</sup>The functions identified: polite directive, habitual co-occurrence/conjunction of situations (patient description of symptoms; doctor elicitation of patient symptoms; general assertion), prediction/prognostication, hypothesising in context of explaining reasoning (re: diagnosis, management, treatment)

<sup>3</sup>Specifically the version of 'speech act conditional' idea from Sweetser, 1990, but a similar distinction with slightly different criteria is found in other classifications as well.

<sup>4</sup>i.e. *if*, *unless*, etc

However, despite the careful delineation implied by the extremely fine grain of the categories, it is not always clear what the motivation is for deciding one way or the other on even an intuitive level. A striking example of this is that while “If you’re hungry, there’s food in the fridge” is a relevance conditional (p. 320), “If the lights go out, I have candles in this cupboard” apparently is not (p. 3), on the grounds that “I have candles in this cupboard” is only a ‘pseudo’ consequent, and the *true* consequent is “*that won’t be a problem because I have candles in this cupboard*”. Why the consequent of the first example cannot be similarly ‘revealed’ to be “*that isn’t a problem because there’s food in the fridge*” is not clear. It should be noted that as this work is essentially an extensive taxonomy description, rather than a true corpus study, these were not awkward edge cases that have been uncharitably dug up from the data – but specifically chosen illustrative examples. So while in some ways the work in Declerck and Reed (2001) provides a guide to the variety in conditionals, it is not an immediately practical tool.

While not a study of conditionals specifically, there is also the work by D’Hertefelt (2015) on the insubordination of complement and conditional clauses in six Germanic languages (English, German, Swedish, Dutch, Danish and Icelandic). She identifies six categories of function which a lone conditional clause can be used to perform, broadly speaking: retroactively modifying another utterance, prompting implicit completion to some conclusion, justifying an attitude, acting as an ‘assertive’, evaluating a situation, and deontic functions including expressing wishes, requests and threats.

Elder, 2015 focuses exclusively on conditionals in dialogue, and classifies the data by communicative role, the perceived ‘primary meaning’, and the co-occurrence between categories of these two axes. The identified roles are described as mostly being on a cline of various levels of discourse, with one additional role in acting as a directive. The roles along the cline are as follows, along with what each is said to refer to (see Elder, 2015, p. 105):

1. describe situation in which consequent situation holds: *situation*
2. provide epistemic grounds for assertion of the consequent: *proposition*
3. provide topic of the consequent: *topic*
4. hedge propositional content of consequent: *truth of proposition*
5. hedge illocutionary force of consequent: *appropriateness of speech act*

However, the ontological/technical consequences of the *if*-clause ‘referencing’ elements on this cline are not the subject of the work: the concern is with primary meaning, and although multiple sources are included as contributing to this primary meaning, the representation does not include its embedding within a wider context<sup>5</sup>.

The primary meaning is explicitly about classifying the overall end result after all pragmatic reasoning has run its course, and is classified by how close it is to the ‘logical form’ of the antecedent and/or consequent, and whether it is an overall conditional meaning derived from both, from just one of the two, or not clearly derived from the logical form of either. The following example (p. 127) is one illustration, with the first item being the original cited from the corpus, and the second its identified primary meaning:

<sup>5</sup>although features of the aforementioned sources are identified as potential cues for recognition of the intended role for a given instance



- They're very very lucky if they get a Diet Coke and slice of pizza.
- I'm not very generous these days.

The above is provided as an example of a conditional whose primary meaning should be classed as not being specifically derived from the logical form of either antecedent or consequent, but as some other meaning (albeit still recoverable from context and knowledge about the antecedent and consequent content). It is worth noting in the context of the wider literature that the 'logical form' here is not a formalisation, but expressed as an English gloss. The formal representations in Elder, 2015 are examples of the final primary/secondary meaning, rather than of preceding stages, although the source(s)<sup>6</sup> of each item is noted. The goal of the work is not to examine their derivation, but in combination with the use of English gloss, it does mean that the derivation of 'antecedent/consequent-like' meaning from the logical form is not within scope.

The focus on the role of the *if*-clause itself in communication is nevertheless illuminating, as the earlier study by Ford (1997) is quite small, and Elder additionally works from a more formal perspective than Ford and Thompson (1986). With the caveat that the example above shows (I think) that opinion is likely to differ significantly when it comes to judging what that 'primary meaning' is, particularly when it is labelled as not obviously derived from antecedent and/or consequent content directly – this study highlights that a significant minority of *if*-conditionals in spoken interaction are used to convey the content of the consequent or *if*-clause: 42% were identified as having a primary conditional meaning, leaving 19% primarily expressing the antecedent or something derived from it, and 36% primarily expressing the consequent or something derived from it (Elder, 2015, p. 133) (the missing 3% is the 'other' category).

### 3.3 A Taxonomy of *If*-Conditionals in Dialogue

Overall, there is a range of work on the tense-modality-aspect combinations in antecedent and consequent clauses, and a small amount of further work on the functions they perform in context. In terms of function, we wish to understand what non-embedded *if*-clauses are being used to achieve in real-world communication. In this respect, the aims are similar to Elder's (and to some degree D'Hertefelt's): however, I will make some further taxonomy adjustments, as described in the next section. In the process of carrying out this corpus study, I want to widen the net to include more marginal cases which are normally set aside, and to gather data for a perspective on how the *if*-clauses interact with their larger context, beyond a recognisable consequent clause. For this reason, the data is based on (unembedded) *if*-clauses, rather than *if*-conditionals per se.

#### 3.3.1 Proposed taxonomy

The function taxonomy here was developed on the basis of an initial pilot study of 300 instances, while also taking advantage of the previous corpus work discussed above. It was further refined through the process of producing a practical annotation guide.

Functions are divided into three groups: *Content*, for providing information, *Metalinguistic*, for managing communication in some way (e.g. being polite), and *Non-assertive*, for performing other speech-acts like giving instructions. These are not all

<sup>6</sup>e.g. world knowledge, the situation of discourse, the word meaning and sentence structure

mutually exclusive: suppose a doctor or nurse says “if you roll up your sleeve we’ll just take your blood pressure”. The *if*-clause here has both a non-assertive function, as a *directive* to roll the sleeve up, and a content function, being an *informative precondition*, part of saying that rolling the sleeve up will be followed by a blood pressure check. As another example, using an *if*-clause to hedge the speaker’s epistemic commitment to an assertion (a metalinguistic function) may be done by making explicit a background assumption such as “if I remember rightly” (a content function). This is a departure from previous studies, which recorded whichever function was judged as most dominant in a particular instance. Following the observation that non-‘speech act’ conditionals are also used for interaction management, it should be possible to identify multiple functions for some *if*-clauses.

The list of functions annotated is as follows, divided into three categories:

#### 1. Content

- Provide precondition:
  - informative
  - comment
  - repetition
  - trivial
- Background
- Polar question answer
- Provide possibility

#### 2. Metalinguistic

- Frame:
  - established
  - introduce
- Hedge:
  - epistemic commitment
  - appropriateness
  - lexical element

#### 3. Non-assertive speech acts

- Directive
- Exclamative
- Question

These are described in the course of the rest of this section.

### 3.3.2 Content

The functions grouped under *Content* affect what the addressee knows, or introduce a scenario for reference. They are divided into two subgroups: those associated with an explicit consequent (*background*, and the *precondition* variants), and those which are not (*present possibility* and the *polar question answer*).

**Provide precondition: informative**

- (31) I dunno i if everyone else is not doing anything, then I'll come. (KP4 318)

In a typically thought-of conditional, the *if*-clause informs listeners about a precondition to some other situation or event. The *informative precondition* provides content without which (given the context) the addressee would either learn misinformation, or fail to learn about some meaningful connection, such as in rule-giving. In the example above, different information would be gained by an assertion of simply "I'll come". The *if*-clause provides extra information that this has a precondition, namely everyone else "not doing anything". Without the *if*-clause, the addressee would wrongly be presented with a definite plan.

Conveying a meaningful link is also part of this: adding an *if*-clause that provides an explicit cause or justification for the consequent is still counted as an informative precondition. Even if the consequent would have originally been fine by itself, removing that *if*-clause would take away information about a meaningful connection.

This includes cases where an *if*-clause is attached to a question, and provides an assumption that needs to be taken into account when answering.

**Provide precondition: repetition**

- (32) I mean I suppose if we were just going for the day it would be alright. Then you could take a friend. If we were going there and back in a day but it wouldn't really be worth it to go to the fair. (KPP 528–530)

*If*-clauses which repeat a previously given precondition are annotated separately. Where a precondition is repeated or rephrased using a second *if*-clause, the removal of one would not necessarily lead to misinformation, since the other remains. The first occurrence is annotated as it would be without the later presence of the second, and the second annotated as a repetition.

**Provide precondition: comment**

- (33) if we didn't have each other to go off with ⟨pause⟩ erm **it** would have made everything for us a lot different (KC7 420)
- (34) I mean if you've got something like, for example, erm say we've got the one we've just had. [...] Now doing that in your head would be a bit awkward. (G61 242)

The *if*-clause can be used to introduce or make explicit a situation for direct comment or evaluation. In the above example, the situation described in the *if*-clause is referenced by "it" in the consequent, so the speaker can comment that it "would have made everything for us a lot different".

**Provide precondition: trivial**

- (35) If you don't want to you don't want to. (KB7 381)

Some *if*-clauses simply form a conditional which is obviously trivial or tautological, even repeating the same content in antecedent and consequent.

### Background

- (36) you ask them about this, this, this and this and they might say this to you, so I **knew what**, *if they asked me*, I **knew what I was talking about** (KC7 278)

The *if*-clause may be used for adding supplementary/extra information about the consequent case, or to make explicit an assumption or presupposition. As a result, these *if*-clauses could be removed without causing misinformation, or a failure to communicate a previously-provided link e.g. that one thing will lead to another. Where those annotated as a *precondition* are necessary to the interaction, *background* cases are those which *in context* could be removed without the loss of anything other than additional detail or clarity of topic.

In the *informative precondition* example previously, removing the *if*-clause would have caused misinformation, and indicated the speaker had definite intent to go to an event. In the example here, the speaker describes her boss giving her advice for dealing with customers. Removing “if they asked me” wouldn’t change the information she’s now giving about that conversation, and rather it provides a reminder that the context for her to ‘know what she’s talking about’ is customers asking her questions.

### Polar question answer

- (37) A: Moderator, can I ask a second question?  
B: If it’s in a different subject from what you’ve asked already. (F85 136-7)

An *if*-clause may be a sufficient response to a polar question. This feature is only annotated where the *if*-clause suffices as an answer, and not when it is used to condition another explicit element, like “Yes, if it’s in a different subject”/“If it’s in a different subject, then **yeah**”. In that case it forms part of the answer, rather than being the answer itself, and should be annotated for its function relative to that consequent.

### Provide possibility

- (38) If I hear that bloody one more time. (KP4 605)  
(39) Now then, if you do these wee exercises Jim and then come back up and see me in ⟨pause⟩ about ⟨pause⟩ f say four weeks. (G46 60)

Where the *if*-clause is not explicitly connected to a consequent, it can still function to introduce a scenario, make some content available for reference, or provide the start of possible conditional to be mentally completed by listeners (e.g. “If I hear that bloody one more time [then... there’s going to be trouble!]”).

### 3.3.3 Metalinguistic

*If*-clauses may also be used to manage communication. This may be by providing a topic or frame of reference for some other content, or by altering/hedging a non-content aspect of the communication e.g. confidence in information, or the appropriateness of an utterance or phrase.

**Frame: established**

- (40) **if he's going to come out**, they'll be coming out, well it's Thursday today, yeah, so **be coming out Friday**, yeah? (KP1 76)

An *if*-clause may indicate the topic relative to which a consequent should be interpreted, or a case in which its information is relevant.

In this example, a previously-accepted proposition (that someone is coming out of the hospital) is made explicit ahead of further conjecture in the consequent. Framing *if*-clauses do not change or widen our understanding of the now-consequent, although they may help a speaker to contextualise it.

**Frame: introduce**

- (41) Well I really want light green. If they've got it (KB6 71-2)
- (42) If we go back to the middle ages we had the situation of craftsmanship (H47 361)
- (43) you're quite welcome to come with me if you want to. (KB7 377)

In the first example above, whether or not "light green" is in stock does not add any information about the situation of the speaker wanting 'light green', but it does (re)raise a related issue of whether achieving that desire is possible. In the next, the topic of the middle ages is introduced using the *if*-clause before being discussed. In the last example, the fact that the addressee is welcome to come with the speaker is relevant information in the case they actually want to come.

The framing subtypes are distinguished by whether the antecedent case has been previously introduced to the discourse. There has been no direct incorporation of a premise vs. biscuit conditional distinction here: what is intuitively a biscuit conditional may use an established fact as antecedent case, as in the following constructed example:

- (44) A: "Ugh, I'm starving"  
B: "If you're hungry, there are biscuits on the sideboard."

More overtly metalinguistic functions which might be subsumed under biscuit conditionals (especially when described as *relevance conditionals* or *speech act conditionals*) are identified as cases of hedging as per the remaining functions in this class.

As the distinguishing characteristic of the classic 'premise' class (antecedent case as discourse old) is not mutually exclusive with the distinguishing characteristic of the classic 'biscuit' class (non-content relationship between antecedent and consequent), a specific premise vs. biscuit distinction is unrealistic in context. Distinguishing on the basis of antecedent status however, does provide a finer grain for this use, and recaptures a similar notion of *if*-clauses used to reference prior content.

**Hedge epistemic commitment**

- (45) And that was (pause) October or November I think, if I remember rightly. (KB3 1799)

An *if*-clause may function to lower a speaker's commitment to some information, e.g. by explicitly describing it as contingent on their own correctness, on the accuracy

of the information source, etc. In these cases the conditional may still provide learnable information, but the overall effect of the *if*-clause is to also mark/acknowledge that this information is potentially fallible. The *if*-clause itself may be trivial, with the 'condition' being something that would otherwise be presupposed as part of the interaction (e.g. that the speaker's memory of what they describe is accurate)

Note that a mention of memory, correctness etc. does not necessarily mean the *if*-clause is being used to hedge the speaker's epistemic commitment: in a statement like "it's a good idea, if you remember what we were saying the last time" the speaker reminds the addressee that they have previously discussed this topic, not weakening a commitment to "it's a good idea", and should be treated as *background*, and not as an *epistemic commitment* hedge.

### Hedge appropriateness

- (46) if I might say so disabled people were treated oddly in those days (*HDM 275*)
- (47) A: Perhaps Pauline you've got some news on that?  
B: Yes, erm if I could here, I did want to add some ⟨unclear⟩ cos obviously I think everybody was taken by surprise. (*D95 51-52*)

An *if*-clause may be used to acknowledge content as risky and potentially inappropriate. Like in the hedging of epistemic commitment, the *if*-clause makes explicit something which would otherwise be presupposed – in this case, the appropriateness of making the statement "It's all a bit much".

This may include describing the topic or purpose of the consequent e.g. "If I could just explain what's going on, ...": I also consider these cases to be appropriateness hedging, as the consequent is being contextualised by the speaker having permission to speak on the subject.

### Hedge lexical element

- (48) Now as regards the actual ⟨pause⟩ well perhaps I should add to that, that there are two **principles** if you like in the theological field which govern the practice of the church. (*F86 211*)
- (49) Was there ever a moment when you f when you were striking the ⟨laughing⟩:[ **bargain** ] if one could call it that, [...] when you when you knew that he'd got you by the short and curlies? (*HEN 193-195*)

In the last function in the metalinguistic category, the *if*-clause is used to hedge the correctness or accuracy of a phrase or word, or some feature of thereof e.g. its pronunciation. In the examples, the speakers are hedging their choice of the words "principles" and "bargain".

If someone were to contradict the condition, what would fail is the lexical choice, rather than the concept it is being used to express. A correction would involve replacing the word or phrase, adjusting the pronunciation etc., but still assuming the underlying content is held constant, only better expressed via the correction, e.g. "Hmph, 'scam' is more like!".

### 3.3.4 Other speech acts

The final set of recognised functions are those where the *if*-clause itself is used to perform some non-assertive speech-act.

#### Directive

- (50) And ⟨pause⟩ right, er if you give me a phone about ⟨pause⟩ twelve on Thursday morning, [...] we should have that result back, be able to tell you what's happening. (G4B 156–158)

The use of *if*-clauses as polite directives is well-noted. Note that these are directives given by the *if*-clause itself, and not imperatives that have an *if*-clause attached. In this example, the *if*-clause is effectively an instruction on what to do as a follow-up to the appointment.

#### Exclamative

“Well now, if it isn't the man of the hour!”

Isolated *if*-clauses can be used as exclamatives. In the end, these are sparse enough that none were found in the corpus data surveyed, but they have still been included in the taxonomy.

#### Question

- (51) A: And if you augment [...] something?  
B: It gets bigger. (G3V 170–172)
- (52) Oh here's some Marmite crisps if you want any? (KPK 96)
- (53) A: **it doesn't include jobs that we've done the design work on and sent to the areas for building.** Erm which  
B: Even if they're over a hundred thousand? (FUJ 111-113)

An *if*-clause with appropriate intonation and context can be used as a polar question. Some are used to prompt for completion, as in the first example, while others check an assumption or possibility, or whether something holds in the *if*-case, as in the second and third.

## 3.4 Corpus Study

800 instances of *if*-clauses were taken from spoken section of the British National Corpus. 300 were taken from transcripts of informal conversation, and 100 each from transcripts of meetings, one-to-one tutoring sessions, medical consultations, media discussions, and interviews. In order to gain data from a wider number of speakers, the individual files did not have all instances catalogued. Instead, only the first ten instances of non-embedded *if*-clauses were selected from each file used, not including instances which were immediately interrupted or otherwise too unclear to understand. Ten instances per file were taken in almost all cases, the exception being samples drawn from medical consultations, where there were too few instances

per file to take sets of ten. An annotation guide was developed to aid with consistency, and the data were annotated according to the functions described above, and according to the form and position of their consequent.

Sections 3.4.1 and 3.4.2 provide a numeric overview of the results, which are discussed in more qualitative terms in Section 3.4.3.

### 3.4.1 Form

While the focus above was on the function of the *if*-clause, this also provided an opportunity to gather *if*-clause constructions not limited to a clear *if*-clause antecedent and indicative clause consequent.

Overall, the majority of instances are found with identifiable indicative clauses. A small number appear to relate to more than one other element, and not necessarily of the same type. All cases with multiple differently-typed consequents still include an indicative clause, meaning that including those with a tag question, 80.75% of the sample is identified as attached to an indicative clause. A further 9.38% are attached to either an interrogative or imperative clause. In short, just over 90% of the sample are found to have an overt clausal consequent, while just under 10% do not. Within that approximately 10%, 4.87% have a consequent of another form, while 5% have no specific identifiable consequent.

To further expand on the set classified as *other*, these include sentential fragments, short monologues from the perspective of another speaker, parts of a conjunction, prepositional phrases, numbers, infinitive phrases, and another *if*-clause (by itself, not a nested conditional).

A small minority of the data (2.88%) is co-constructed. This small sample includes cases of interruption/‘true’ co-construction for completion of the *if*-clause and of the consequent, including perspective shift, provision of an entire consequent or a retrospective *if*-clause, whether to add a restrictive condition or for emphasis on an additional case, or editing/expanding the *if*-clause or consequent as given.

TABLE 3.1: Consequent types.

Form	Count	%
ind	619	77.38
ind-tag	17	2.12
int	47	5.88
imp	28	3.5
polar	8	1.0
np	12	1.5
adj	4	0.5
adv	2	0.25
multi	10	1.25
other	13	1.62
—	40	5.0
Total	800	100.0

TABLE 3.2: Frequency of co-construction.

Co-construct?	Count	%
yes	23	2.88
—	777	97.12
Total	800	100.0

TABLE 3.3: *If*-clause positioning relative to a consequent.

Position	Count	%
pre	536	67.0
mid	18	2.25
post	206	25.75
N/A	40	5.0
Total	800	100.0



The majority (two thirds) of *if*-clauses are positioned before a consequent, and a significant minority of roughly a quarter are positioned afterwards. A small minority are added mid-consequent (not counting those where the consequent is restarted after the *if*-clause, which are considered cases of correction to a prepositioned *if*-clause).

### 3.4.2 Function

I will address the different function categories separately first, and then move on to their co-occurrence.

The number of *if*-clauses serving as the answers to polar questions is only an eighth of those without an explicit identifiable consequent: evidently, these lone *if*-clauses must be being used for something else. This will be explored further in Section 3.4.3.

Unsurprisingly, the most common function overall is the use of an *if*-clause to provide an informative precondition to some consequent, with almost 70% of all instances coming under this category. The second most common content-use (7.25%) is a background information use, to provide supplementary information about some situation, or a clarify/make explicit an assumption. This includes ‘reminder’ *if*-clauses which make explicit what could normally be assumed as a condition of discourse (as in (54)), those which make explicit a less ‘standard’ working assumption of the speaker (as in (55)), and those which add some clarifying but unnecessary supplementary information (as in (56)).

- (54) And that was ⟨pause⟩ October or November I think, if I remember rightly. (KB3 799)
- (55) I’m reporting this excellent news to you guys ⟨laugh⟩ if you are listening out there from the national library association (KE5 12)
- (56) The men were kind, very kind. Nobody’d let me wheel my bike or carry my bag. If they were about. (HEL 125–127)

TABLE 3.4: *If*-clause content functions

Function	Count	%
pcinfo	559	69.88
pccomm	46	5.75
pctriv	5	0.62
pcrep	8	1.0
bkgd	58	7.25
ppqans	5	0.62
poss	31	3.88
—	88	11.0
Total	800	100.0

TABLE 3.5: Other functions of *if*-clauses without a content function

Function	Count	%
happ	8	9.01
hepist	1	1.14
hlex	9	10.23
frame-est	14	15.91
frame-intro	52	59.10
frame-intro + q	2	2.27
q	2	2.27
Total	88	99.92

A small percentage (1%) are used for clarification through repetition (possibly with slight rephrasing) of a prior *if*-clause, and an even smaller percentage for inherently redundant uses, forming trivial conditionals like (57):

- (57) Well if they’ve gone, they’re gone aren’t they? (KE6 676)

TABLE 3.6: Other functions of *poss if*-clauses

Function	Count	%
dir	14	45.16
dir q	1	3.23
q	1	3.23
frame-intro	2	6.45
happ	1	3.23
—	12	38.7
Total	31	99.99

TABLE 3.7: *If*-clause metaling. functions

Function	Count	%
frame-est	17	2.13
frame-intro	75	9.38
happ	9	1.13
hlex	9	1.13
hepist	5	0.62
—	686	85.75
Total	800	99.99

TABLE 3.8: Other *if*-clause functions

Function	Count	%
dir	21	2.62
q	10	1.25
dir q	1	0.12
—	768	96.0
Total	800	99.99

A notable minority (5.75%) are used to provide a precondition for comment, essentially acting as a vehicle for some situation to be then evaluated or discussed.

A large minority (11%) are judged to perform none of the content functions. Three quarters of these were *frame* uses, providing the situation or issue relative to which some other content is relevant or should be interpreted, as in (58). Framing which re-iterated prior content (*frame-est*) was outnumbered by framing which explicitly articulated the *if*-case for the first time, at ratio of about 1:4. Significant minorities of the non-content cases, around 10% each, are used to hedge lexical items as in (59), or to hedge the appropriateness of an utterance as in (60).

- (58) They're to be eat away. If they're beautiful I can buy them again. (KE4 1712–1713)
- (59) I feel more allegiance, if you like, with er, a male working class person than I do perhaps with a female member of the (unclear) class (FL7 193)
- (60) Sorry, if I could just clarify, I was actually at the meeting of Women's Sub ... (KS1 91)

Almost half of *poss if*-clauses are used as directives, but a similarly large (though smaller) portion had no other function (38.7%). While the raw number is small, it is nevertheless notable that a large portion are used for introducing the possibility/situation only, and not additionally for the other functions recognised.

The majority of the sample does not hold a metalinguistic function, but over 10% are used for framing, with small numbers otherwise being used to hedge lexical choice, to present issues of appropriateness or permission for making an utterance, or to hedge epistemic certainty.

Lastly, the most common speech act function performed with an *if*-clause is giving a directive. The one instance marked as both a directive and question is (61) below:

- (61) *Anon 1*: erm are you due an insurance line today?  
*John*: Yes, I am Doctor. Er if you actually date it from yesterday?  
*Anon 1*: Mhm sure, (H5M 64–66)

This was annotated as both a directive and question on the grounds that it is essentially both a polite directive and request.

### 3.4.3 General Observations

There are a number of different features in the data to comment on.

#### Trivial antecedents

- (62) *Ann*: I don't want to.  
*Stuart*: You don't want to. Well there you are then. If you don't want to you don't want to. (KB7 378–381)
- (63) Well **if they've gone, they're gone** aren't they? (KE6 676)

In the above example, the antecedent and consequent are identical, and both repeat information from the addressee's previous turn. The *if*-case is already established as true, and the consequent does not express any new conclusion drawn from that information. Even so, use of a tautological conditional seems to give some extra finality to the speaker's acceptance, more-so than his initial repetition. These tautological uses should be pragmatically justifiable, to validate their use over a plain assertion (e.g. a redundant Explanation discourse relation, emphasising the self-sufficiency of the antecedent case), but this needn't interfere with the underlying semantic analysis.

#### Absent consequents

- (64) *June*: Well, they they just, they go away when you take them somewhere fresh. <cough> and they don't know where they are.  
*Sasha*: That one.  
*Albert*: They're very very <pause>  
*June*: Sometimes, you're lucky, and you know, **if if you keep them in long enough** (KB1 517–521)

These are not *if*-clauses which have an earlier unconnected (sub-)utterance as consequent, but *if*-clauses which have no explicit consequent at all. The audio of the example above was checked to confirm that it was not cut off or interrupted, and the speaker gives no explicit consequent. The polar-question answers should be resolvable through appropriate treatment of polar questions. Lone *if*-clauses introducing a possibility into the discourse more generally however, require dealing with the *if*-clause itself as having a role in communication.

Not all of these isolate *if*-clauses are created equal, however. In example (64) above, the speakers have been discussing how pet cats are liable to wander off and vanish when taken on a house move. Given the question(s) under discussion, it seems reasonably natural to use the *if*-clause as antecedent for some implicit content along the lines of 'they won't run away'.

Stirling (1999) argues for recognition of isolated directive *if*-clauses as a sentence-type, with the 'main clause' truly absent rather than ellipsed or implied, and as noted

by D'Hertefelt (2015), some lone conditional clauses are easily compatible with an overt consequent, while others resist completion. Non-directive consequentless *if*-clauses should not necessarily be treated as significantly different from their directive consequentless cousins however, since this function is also performed by *if*-clauses with overt consequents.

The following data point was discarded from the pilot data as abandoned (rather than being a no-consequent case) partly due to non-final prosody when the audio was checked:

- (65) *Chris*: What, have I gotta take him up?  
*Angela*: Yeah because Jenny might, she might be on a late. **If she's on a late.**  
 But she's on a early she can come with him and we'll go in her car. (KB6 22–25)

However, the lack of final prosody may not be due to being incomplete: it is followed by a slight pause, which may have been space for a gesture. Given the context of the preceding question, it seems plausible that the *if*-clause in combination with a gestural 'consequent' was used to clarify the original answer. With only audio, there is no way to tell, but this case nevertheless serves as a useful reminder: non-verbal communication can serve as 'consequent' to an *if*-clause as well.

Some *if*-clauses used to hedge appropriateness are not associated with a consequent, but are independent *if*-clauses with the hedged material introduced in the *if*-clause only. One notable example of an isolate *if*-clause was the following:

- (66) **So if I can open the meeting by saying that we obviously welcome questions this evening and points of view** and I would like to open the meeting by asking quite clearly about how you er see best plan for the theat theatre in future and how it's programme of facilities for the future should be programmed and planned. (D91 10)

The speaker does not subsequently say that they welcome questions and other points of view, but does so entirely via this *if*-clause, framing it as a permission/appropriateness issue. The *if*-clause is used to introduce the relevant information into the context, while also contextualising the current stage of the interaction as the opening of the meeting. The *if*-clause is useful for this even without a consequent. Less striking examples were also found, which did contain information in the consequent contextualised by e.g. "If I could just explain", but this case is especially notable as the *if*-clause itself not only contextualising the information and adding an element of politeness, but is the exclusive source of the information to be conveyed.

### Ambiguous consequents

- (67) But if not if, if ⟨pause⟩ I go up with them and I'd go in with them. Just wait in the car. I'll go in with them and see what I gotta get . . . and just strap it on the roof. And he'll come home and do it he said. (KB6 27–30)

The above is an extended narration following from an *if*-clause, but because of the tense it is still possible to recognise a clear cut-off where the *if*-case is no longer being described. This is not necessarily so in cases where there is real-time actualisation of the *if*-case, e.g. as found in tutorial/demonstration settings, like the following example:<sup>7</sup>

<sup>7</sup> which is admittedly somewhat difficult to parse without a visual

- (68) Oops then if I square both sides of that equation, then sixteen, minus thirty *i* equals the *a* plus *b*, *i*, square, yeah, that's just the square on both sides, so sixteen minus thirty nine equals square this out under *a* squared, plus two give me (unclear), plus three squared, *i* squared. (KB5 395)<sup>8</sup>

'Play-by-play' conditionals like the above are common in the tutoring/teaching sessions covered in this study, where the speaker partially narrates their actions and reasoning as they are (likely) simultaneously realised on the blackboard/paper.

In other cases, it is not clear whether or not something should be considered a consequent or not. This is especially true once we recognise that *if*-clauses can be and are used without any consequent at all. Take the following example:

- (69) And Darren looks like an oversized leprechaun, all dressed in green and ready to go, meanwhile **I'm reporting this excellent news to you guys (laugh) if you are listening out there from the national library association** (KE5 12)

There are two ways to view this example<sup>9</sup>: as being attached to *I'm reporting this excellent news to you guys*, or as being a more general expression of the speaker's assumptions in the whole prior narration segment (and lack of iron-clad certainty about them), since it is added as a later retrospective comment.

In a naturalistic setting the *if*-clause can both condition items beyond its 'main clause', and repeat information that is accepted and salient. As a result, drawing the line at which the content should no longer be considered related to the *if*-clause is not always as easy as finding a clause boundary or the end of a series of modals. If in some cases the line is a blurry one, that is worth noting.

### Performative/quotative consequents

*If*-clauses were used to create context for an imagined direct or paraphrased quotation, or an exclamation.

- (70) This this is what I'm saying last time that if you'll work through it, understand it, Oh yeah I can do that, (FM5 25)
- (71) (add one of the 'my fault' examples)

In example (70), the *if*-clause is a contextual set-up for the speaker to act out the addressee's role and thought-process in the *if*-clause scenario. Rather than posing some covert prefix equivalent to "you will think *x*", it is preferable to handle cases like this as they appear, i.e. imagined direct quotation.

### 3.4.4 Dealing with the data

Having looked at the dialogical data above, we can consider it in light of the accounts of conditionals introduced in the previous chapter. When it comes to extending the accounts of hypothetical conditionals, some assumptions are challenged by the more general speech data.

As already warned, truth functional accounts by themselves cannot be scaled up to more general use of the construction. These accounts assume (a) a truth-valued element for consequent, and (b) a truth-valued result (I am including here the third

<sup>8</sup>transcript slightly corrected

<sup>9</sup>in practice this instance was annotated as having an indicative consequent

value/non-value # as a 'truth value'). In the speech data, *if*-clauses are used with non-propositional consequents, or (deliberately) with no consequent at all.

The speech data also includes *if*-clauses associated with sub-clausal segments. In variably strict analyses, the role of the *if*-clause in creating a temporary context for evaluation will thus require quite a fine, incremental notion of context change. These examples also present a challenge for pragmatic extensions which handle non-hypothetical conditionals, as some lexical hedging involves items which, by themselves, are not otherwise used to form *if*-clause constructions. There are both semantic and pragmatic approaches to non-hypothetical uses: while a pragmatic solution (i.e. one that enables a unified semantics) is more appealing for its coverage, these metalinguistic cases for segments which have no 'hypothetical *if*-clause' equivalent use are potentially problematic.

The data also contained lone *if*-clauses which do not appear to be cut off or interrupted, but rather are used deliberately. The restrictor implementation of a variably strict semantics proposes that the *if*-clause itself does nothing but restrict another operator. This is not impossible with a lack of consequent – see the persistence of interrupted or repaired material in a context, and the potential for inference of utterance completion in general. Nevertheless, it is a significant burden for an *if*-clause whose effect on context is pending application to another operator.

The content functions used with a consequent are generally typical indicative cases. Both *if*-clauses which provide a necessary<sup>10</sup> informative precondition and those which provided supplementary background information are used to express a connection or line of reasoning. This does not favour one underlying semantic approach over another, but is not covered by them, and does need to be addressed in a dialogical account of their function. This will be the aim of Chapter 4.

The uses of *if*-clauses themselves to perform other speech acts, especially directives, do not so much tell us about the conditional as they do about the required treatment of speech acts. This directive interpretation cannot conflict with the *if*-clause's role in a conditional, in light of *if*-clauses that both license a directive and provide a precondition to a consequent state, e.g. as in the tutorial examples. It should be possible to deal with these uses via additional measures rather than it constraining the choice of underlying semantics, so long as there is access to the content of the *if*-clause to make inferences from.

Hedging or non-content uses are identified where a speaker hedges their knowledge or accuracy, their word choice, and appropriateness. To keep a unified account for the more challenging metalinguistic cases which apply to segments otherwise unsuitable for combination with an *if*-clause, a more general analysis, e.g. context effects, is required to deal with these consequents with content below the level of the proposition (or question, or imperative), below the level of the clause, and below the level of a speech act. Treatment of these more varied uses will be addressed in Chapter 5. The potential for an account synthesising this with an underlying semantics for hypothetical conditionals will be explored in Chapter 6.

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<sup>10</sup>Necessary in the contextual sense that removal of the *if*-clause would lead to misinformation vs. the information provided by the conditional, rather than being a necessary condition for the consequent case.

### 3.5 Conclusion

In the corpus study above, I use a taxonomy of function based on the *if*-clause's role in context. The motivation in doing so is to capture a wide range of forms and allow for multiple functions at once, and to help avoid false dichotomies about distinction between certain uses. The intent is partly to provide a perspective on the prominence of said forms and functions, especially those which are less common, and partly to take the opportunity to gather a wide range of attested uses.

Unsurprisingly, as corpus data and speech data in particular, it is noisy and variable. The majority of the *if*-clauses are used to form hypothetical conditionals providing a condition for a consequent and without which information would have been lost. In-context repetition of established information (i.e. factual or premise conditionals) also formed a significant minority of the remaining cases.

Beyond this, there is additional food for thought. The boundaries of the '*if*-conditional' are not always clear, while the segment most identifiable as a consequent is in some cases unusual, including cases of (hypothetical) direct quotation. Unembedded *if*-clauses with no consequent are also used deliberately, in some cases appearing to prompt the inference of what a consequent may or should be, but at other times to contribute information which did not appear elsewhere.

## Chapter 4

# Conditionals and Argument

### 4.1 Introduction

One role identified for conditionals in dialogue is argument and rule-giving. In the first example below, students have discussed their bad experiences with teachers at their school, and subsequently link this to the lack of enrolment and lack of encouragement for prospective students to attend. In the second example, a retired crane driver explains the protocol when there was a lull in crane work during the day.

(72) *Unknown*: er we all hate the school ⟨pause⟩ and if we all hate the school, no wonder no girls are coming.

*Unknown*: Mm.

*Unknown*: If you hate the school, you're not going to say to someone hey come to Haileybury.

*Unknown*: Right.

*Unknown*: Right. (KPH 574–8)

(73) If a docker, you got to help the dockers down the hold, you had to go in the warehouse if there ain't nothing to do. But course now the present day they don't do none of that, they drive the crane and only the crane, they don't even clean the crane. (H5H 9–10)

In each case, an addressee should This is an aspect which goes beyond whether the conditional is true or false, and so is not a matter of concern for most semantic analyses of conditionals. Nevertheless, it is a role they play in dialogue, and an effect they have on the dialogue state, and from a dialogical perspective has to be included in an account of conditionals.

Arguments and justifications in interaction tend to be underpinned by general principles and rules of thumb, rather than being truly 'logical'. For models of dialogue to be adequate then, these non-logical arguments need to be handled. Breitholtz (2014a) proposes that this is through incorporating enthymemes and topoi, notions from rhetoric, into the dialogue model. Enthymemes are non-logical arguments which do not hold up by themselves, but are acceptable through their relation to a topos, an already-known general principle or pattern for reasoning.

From a conditional perspective, the content of the antecedent and consequent of a conditional, not just their truth or falsity, makes a difference to whether we find the conditional acceptable or not, generally rejecting those that seem disconnected (Douven, 2008). If we are to model conditionals in a way that reflects their acceptability, we must include some means of making those judgements.



Apart from the evidence from their acceptability conditions, which correlate strongly with judgements of high conditional probability, conditional structures are also already associated with argument and reasoning, being used as plain-language explanations of particular topoi (e.g. “if something is a bird, then it flies” in Breitholtz, 2014b), or used as materials on reasoning in any number of experiments (e.g. Pijnacker et al., 2009). If we are going to explicitly recognise the use of such ‘rule’ type objects in discourse anyway, then conditionals are one place where they show up, at least sometimes.

This chapter aims to incorporate the argument and rule-giving effect of conditionals into the dialogue model. To do so, there are two supporting goals. First, to propose a formalisation of enthymemes and topoi that is geared towards relating them to more complex rule-based world knowledge. Second, to account for the acceptability (or not) of conditionals by proposing an enthymeme-like structure as associated with *if*-conditionals, such that topoi can enhance their content, and which are used in judging whether a given conditional is acceptable or not. The acceptability of conditionals is linked to perceived relationships between the antecedent and consequent cases: with enthymemes and topoi, whose presence in the model is independently motivated, we can incorporate this non-arbitrarily into the dialogue state.

The next section will provide some background, while section 4.3 addresses the goals above. Section 4.3.1 is focused on enthymemes, topoi, and specification of the alternative formalism, while sections 4.3.2 and 4.3.3 use this to specify context update rules associated with conditionals. In dealing with enthymemes and topoi I will draw especially on the work in Breitholtz (2014b) and Breitholtz (2020) etc.

## 4.2 Background

### 4.2.1 Acceptability and conditionals

Stalnaker (1970b) proposed that the probability of a conditional and the conditional probability of the consequent on the antecedent are one and the same, in what is usually referred to as *the Equation*. That is, the overall probability  $P(\text{if this doesn't get interesting then I'm going home})$  is the same as the conditional probability  $P(\text{I'm going home} | \text{This doesn't get interesting})$ . The acceptability of conditionals correlates strongly with their conditional probability: the more likely the consequent is in the antecedent-case, the more acceptable the conditional tends to be.

A subsequent proof by Lewis (1976) found that there is no single proposition based on the antecedent and consequent such that its probability will consistently match the conditional probability. Therefore one could have a propositional theory of conditionals, or validate the Equation – but not both.

The assumption that conditionals express a proposition is fundamental to most linguistic work on the topic. By conditionals being ‘propositional’, we mean that adding an *if*-clause to some indicative clause does not fundamentally change the kind of semantic object it is: for indicative clause “I’m going home”, just as the conjunction “I’m going home and I’m watching a film” still expresses a proposition, so does “If this doesn’t get interesting soon, I’m going home”.

However, conditional probability seems so important to the meaning of conditionals that in the view of some non-linguists (e.g. Edgington, 1995; Bennett, 2003), conditionals should properly be considered to be probabilistic, directly expressing the conditional probability of the consequent on the antecedent,  $P(\text{cons} | \text{ant})$ .

Subsequent empirical work overwhelmingly supports the intuition behind the original Equation, and shows that conditional probability tends to correlate with acceptability (e.g. Evans, Handley, and Over, 2003; Oaksford and Chater, 2003), at least for hypothetical conditionals. Conditional probability thus needs to be taken seriously, whether one believes it is the core content of a conditional or not: indeed, figuring out how propositional theories can accommodate its relationship to acceptability is an important issue (e.g. Douven and Verbrugge, 2013). Conditional probability is also not the only factor in acceptability: it is further moderated by whether there appears to be a connection between antecedent and consequent (Skovgaard-Olsen, Singmann, and Klauer, 2016). An always-true consequent  $q$  and some antecedent  $p$  don't create an acceptable conditional where they are perceived as disconnected, even though the always-true  $q$  means that  $P(q|p) = 1$ . To make these judgements, we need to know about the relationships between the antecedent and consequent states.

This chapter remains agnostic about whether the update rules in Section 4.3.3 should also add a proposition associated with *if*  $p$ ,  $q$  to the agent's knowledge base, were they to be more comprehensively specified. In Chapter 6 I will eventually take the propositional stance in terms of conditional content, but the underlying acceptability issue, and the potential use of topoi in the metrics underlying those acceptability judgements, means that this does not impact on the core of the proposals here.

#### 4.2.2 Enthymemes and topoi

Enthymemes are incomplete non-logical arguments that get treated as complete ones. They are incomplete in that to be accepted, they must be identified as a specific instance of a more general pattern that is already in the agent's resources – a topos. Topoi encode world knowledge that comes as a 'rule of thumb', such as characteristics typical of groups, and a speaker may hold contradictory topoi as equally valid in different scenarios, with no clash experienced unless both are invoked at the same time. Speakers make enthymematic arguments by linking what on the surface might technically be non-sequiturs, but are easily identified as an argument using accepted principles. For example, a speaker might say "Let's go left here, it's a shortcut". In doing so they invoke an assumption that shorter routes are better, and that therefore the left turn being a shortcut is a good reason to take it – but they might equally say "it's longer", invoking an assumption that a longer route is preferable.

Topoi have been proposed to be a resource available to speakers in dialogue, and consequently a means to address non-monotonic reasoning (Breitholtz, 2014b), the treatment of non-logical rules as expressing necessity, and contradictory claims being equally assertable, as in the route-taking example above (Breitholtz, 2014b).

To these ends, they have been formalised in TTR for use in dialogue (Breitholtz and Cooper, 2011), as functions from records to record types, as in this example (Breitholtz, 2014b):

(74) a. *Topos*:

$$\lambda r : \left[ \begin{array}{ll} x & : \text{Ind} \\ c_{bird} & : \text{bird}(x) \end{array} \right] \left( \left[ c_{fly} : \text{fly}(r.x) \right] \right)$$

b. *Enthymeme*:

$$\lambda r : \left[ \begin{array}{ll} x = \text{Tweety} & : \text{Ind} \\ c_{bird} & : \text{bird}(x) \end{array} \right] \left( \left[ c_{fly} : \text{fly}(\text{Tweety}) \right] \right)$$

Both are of type  $Rec \rightarrow RecType$ , and the fields of the specified record types match, but fields of the enthymeme have been restricted to specific values. A function to a record type does not by itself indicate what happens once we have access to that type. For these functions to be useful, they are additionally governed by a theory of action, which will license various actions that can be performed with the type, e.g. judging that the original situation is additionally of that type, judging that there exists some situation of the type described, or creating something of that type (Cooper, in prep). More generally, Cooper suggests that given a topos/enthymeme  $\lambda r : T_1.T_2(r)$  and  $s : T_1$ , it can be specified that  $T_2(s)$  can be used in one or more of several ways:

- an agent can (is licensed to) make the judgement  $s : T_2(s)$
- an agent can (is licensed to) make the judgement that  $T_2(s)$  is non-empty (“true”), that is, there is some  $s' : T_2(s)$
- an agent can (is licensed to) wonder whether  $s : T_2(s)$  or whether  $T_2(s)$  is non-empty
- an agent can be licensed to create something of type  $T_2(s)$

### 4.3 Enthymemes for conditionals in dialogue

Given that their presence in an agent’s resources is already motivated, topoi are an appealing way to account for the required knowledge about some ‘dependence’ between antecedent and consequent. Enthymemes and topoi are snippets of reasoning, rather than complex networks, but they should also be related explicitly to other rule-like world knowledge, which includes the possibility of multiple relationships between more than two cases. If we are going to use topoi to express the kind of knowledge that also forms such networks (i.e. informative about causality or related probabilities), then they should be in the same form as that knowledge: the alternative, to keep rule-like topoi apart from knowledge about rule-based(ish) systems, is counter-intuitive.

Bayesian networks (a combination of directed acyclic graphs and probability distributions) are a common way to encode causal relations. They have two components, the first of which is a directed acyclic graph, with the various variables as nodes, and directed edges describing any direct relationships. Graphs and networks are a useful way to describe relationships, and express a more complex set of relationships than a linear chain of functions. The graph structure is in accordance with constraints about what direct parenthood in the graph can mean – that the parent is part of the minimal set of preceding nodes whose value determines the probability distribution of the child.

The second component to a Bayesian Network is a set of probability functions for determining the values of variables given the values of their parents – their conditional probabilities. Associated probabilities are also a natural means of modelling learning, by adjusting the confidence in a given rule on the basis of evidence and experience, allow us to make explicit the level of confidence in a judgement beyond a binary. For unreliable rules, a high (but below 1) probability can be used to express that they are likely to be correct in a given case, but not certain.

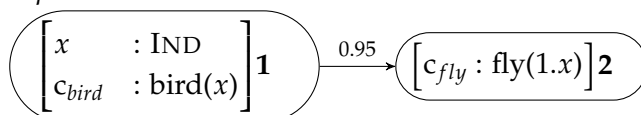
### 4.3.1 Enthymemes and topoi as networks

The proposal is as follows. Topoi and enthymemes are of the same type as any other ‘relational’ knowledge, by which I mean knowledge about causal and correlational relations. This knowledge can be encoded as a graph: topoi and enthymemes as usually discussed are minimal examples, containing only two nodes. The direction(s) of the links between connected nodes, indicates the direction of the causal relations.

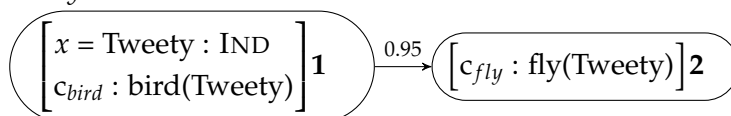
Where there is a bi-directional link somewhere in a path between two nodes, their relationship is confirmed as non-causal. Where there is an absence of any path between two nodes, the relationship may be treated as potential independence, while where there are links in one direction only, the relationship may be treated as potential causality. However, neither the potential independence or causality is locked in: there should be a distinction between merely lacking information, and having confirmation about an absence. Certainty about independence or causality is expressed via constraints explicitly preventing the creation of any path that would violate them.

All this is meant to allow for a more complex set of relationships than expressed in a standard topos which, as stated earlier, is a minimal case with just two nodes. The original example can be thought of as follows, graphs with only two nodes:

(75) a. *Topos*:



b. *Enthymeme*:



Once  $x$  is filled (as ‘Tweety’), this should be reflected in any other nodes where the same variable appears. The confidence rating of 0.95 has been somewhat arbitrarily set here for topoi to imply high confidence without certainty. Generally, the confidence rating associated with a link in a known network should be subject to change on the basis of experience, increasing or decreasing as their predictions are borne out or subverted. Topoi as ‘rules of thumb’ are particularly robust to contradictory evidence, with the same agent in different contexts accepting and using topoi that lead to opposite conclusions: see, for example, notions *opposites attract* vs. *birds of a feather flock together*. Integration of ordinary learning with the potential for entrenched ‘against all evidence’ beliefs is a larger topic that is not addressed here, but will be necessary in future work.

Enthymemes are distinguished from other arguments by the fact they don’t hold up by themselves, but are instead accepted on the basis of identification with a topos – this doesn’t include arguments that are accepted despite being unsupported. However, the terms enthymeme and topos will continue to be used here: once the context indicates that an enthymematic argument is being made (such as a recognisable suggestion and motivation pattern like “Let’s go left here, it’s a shortcut”), an unsupported ‘enthymeme’, once accepted, can be used to establish a potential new topos in the speaker’s knowledge base (Breitholtz, 2015).

### Modelling enthymemes and topoi as networks

Having suggested that enthymemes and topoi can be modelled in a more general way, in accord with other relational knowledge, this subsection provides a treatment in TTR of the proposal. The general form of the network is characterised, including components of the graph, associated and probability distributions, followed by additional constraints and conditions for interpretation. With this done, the original enthymeme and topos example, illustrated in network-form in (75) can be re-stated in the network formalism.

The variable at each node is a *RecType*, representing a situation type, with the probability of a *RecType* being across whether it is true or false (for type  $T$ , whether  $\exists a : T$ , i.e. whether a situation of such a type exists).

Introducing an index on the nodes will allow the *links* field to track which members of *nodes* have links in the graph. However, the *links* field does not just consist of pairs of indices, but pairs of indexed *RecTypes*. By using entire *RecTypes* rather than indices, we can take advantage of their rich structure and add dependencies between fields of linked nodes in the network, as in the original function-based formalisation of topos.

Let  $RecType_i$  be a *RecType* associated with an index, and type *ProbInfo* be a constraint on some probability. The supertype of enthymemes and topoi, rather than a function  $Rec \rightarrow RecType$ , is the type *Network* as follows:

$$(76) \quad Network =_{def} \left[ \begin{array}{l} \text{nodes} : \{RecType_i\} \\ \text{links} : \{\langle RecType_i, RecType_i \rangle\} \\ \text{probs} : \{ProbInfo\} \\ c_{index} : \forall \langle x'_j, y_p \rangle, \in \text{links}, x'_j \sqsubseteq_r x_i \in \text{nodes}, i = j, \\ \quad \quad \quad \forall \langle z_q, x''_k \rangle \in \text{links}, x''_k \sqsubseteq_r x_i \in \text{nodes}, i = k. \\ c_{links} : \forall \langle x'_i, y'_p \rangle \in \text{links}, \exists x_i, y_p \in \text{nodes}, x'_i \sqsubseteq_r x_i, y'_p \sqsubseteq_r y_p \end{array} \right]$$

The *nodes* field is the set of nodes in the graph, while the *links* field is the set of directed edges between them, each 'link' being an ordered pair.

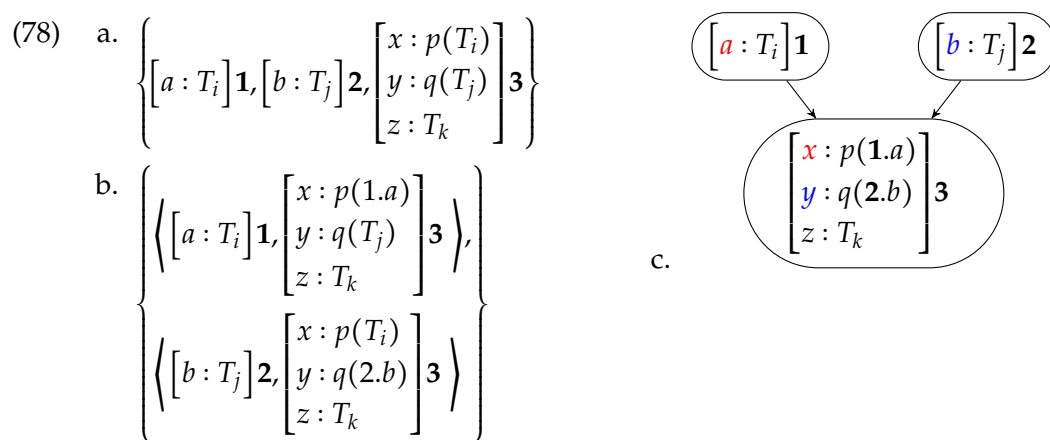
The constraints  $c_{index}$  and  $c_{links}$  ensure consistent use of indices in characterising the graph. Let  $\sqsubseteq_r$  indicate a subtype relation where subtyping is through restriction of one or more fields i.e. not through the specification of extra fields. By this, I mean that of the two subtypes of (77a) in (77b) and (77c), the second obeys  $T_2 \sqsubseteq_r T_0$ , as it contains the same fields, but with field  $x$  a more narrowly defined subtype of IND, namely the singleton type  $IND_{mitzi}$ , a subtype of IND.

$$(77) \quad \begin{array}{l} \text{a. } T_0 = \left[ x : IND \right] \\ \text{b. } T_1 = \left[ \begin{array}{l} x : IND \\ y : IND \end{array} \right] \\ \text{c. } T_2 = \left[ x = mitzi : IND \right] \end{array}$$

The first constraint  $c_{index}$  enforces co-indexing, ensuring that if subtypes of a node are included in members of *links*, they all share the same index. Note that these are potentially subtypes rather than just replicas of the master copy in *nodes*, as they may have additional restrictions relative to the other node in the link. The second constraint

$c_{links}$  specifies that any members of *links* are between (potentially restricted subtypes of) members of *nodes*. For ease of reading and the sake of space, the constraints will not be repeated in further examples. In a link  $\langle x_i, x_j \rangle$ , the specification of member  $x_i$  may use  $j$  to indicate some  $r : x_j$ , and vice versa, e.g. where  $a$  is some field in  $x_i$  and  $b$  is some field in  $x_j$ , in  $x_i$  we can specify that  $a = j.b$ .

(78c) illustrates a set of nodes (78a) and links (78b), and how the specification of fields in an individual node in the network can be inherited from multiple links in which it participates. The first link between **1** and **3** specifies a constraint on the first field  $x$  of **3** depending on the content of field  $a$  in **1**. The second link between **2** and **3** specifies a constraint on the second field  $y$  of **3** depending on the content of field  $b$  in **2**. When taken all together, individual fields in node **3** in the network will inherit constraints from distinct nodes.



Causality, non-causal correlation and independence between the nodes are interpreted on the basis of the paths between the nodes as encoded in *links*. Where a path is a sequence of indices  $\langle 1, \dots, k \rangle$  such that for each  $i, i + 1$  there is  $\langle x_i, x_{i+1} \rangle \in links$ , the node indexed  $i$  is a predecessor of the node indexed  $j$  (shorthand:  $predecessor(i, j, links)$ ) if there is a path from  $i$  to  $j$ , given the contents of *links*. For example, for a set of links  $\{\langle \mathbf{1}, \mathbf{3} \rangle, \langle \mathbf{2}, \mathbf{3} \rangle, \langle \mathbf{3}, \mathbf{4} \rangle\}$ , there is a path  $\langle \mathbf{1}, \mathbf{3}, \mathbf{4} \rangle$  and **1** is a predecessor of **4**. More informally, for a path made up of a sequence of links which included nodes at indices  $i$  and  $j$ , the node at index  $i$  is a predecessor of the node  $j$  if it appears first in the path.

In this way the set *links* can be checked for evidence that two nodes are in a non-causal relation (if there is a bi-directional *predecessor* relation somewhere in a path between the two, e.g. if  $\langle x_i, x_j \rangle, \langle x_j, x_i \rangle \in links$ ), are potentially independent (there is no *predecessor* relation at all between the two), or in a potentially causal relation (one is a *predecessor* of the other, but not the other way around). We can distinguish direct and indirect causality by whether a minimal path with a direct link  $\langle x_i, x_j \rangle$  is possible or not, e.g. the direct link between **1** and **3** in the example, vs. the indirect between **1** and **4**. As a rule, when I talk about causality, I will mean direct causality.

For network  $n$  containing nodes  $x_i$  and  $x_j$ , independence and causality can be expressed in updated network  $n'$  as follows, where  $a \wedge b$  indicates the merge of two records, a record containing all fields from both, and  $a \overline{\wedge} b$  indicates their asymmetric merge (see Cooper and Ginzburg, 2015), where in the event of a field appearing in both records, the field from  $b$  is the one found in the merge, effectively overwriting the field of  $a$ .

(79) *Independence of  $i$  and  $j$ :*

- $$n' = n \wedge [c_{ind_{ij}} : \neg predecessor(i, j, links) \wedge \neg predecessor(j, i, links)]$$
- (80) *Direct causality from i to j:*
- $$n' = n \wedge [c_{cause_{ij}} : \langle i, j \rangle \in links \wedge \neg predecessor(j, i, links)]$$
- (81) *Indirect causality from i to j:*
- $$n' = n \wedge [c_{indcaus_{ij}} : predecessor(i, j, links) \wedge \neg predecessor(j, i, links)]$$

Returning to topoi and enthymemes, the original *Tweety* example can now be rewritten as (82):

- (82) *Topos:*
- $$\left[ \begin{array}{l} \text{nodes} = \left\{ \left[ \begin{array}{l} x : \text{Ind} \\ c_{bird} : \text{bird}(x) \end{array} \right]_1, \left[ \begin{array}{l} x : \text{Ind} \\ c_{fly} : \text{fly}(x) \end{array} \right]_2 \right\} : \{RecType_i\} \\ \text{links} = \left\{ \left\langle \left[ \begin{array}{l} x : \text{Ind} \\ c_{bird} : \text{bird}(x) \end{array} \right]_1, \left[ \begin{array}{l} x = 1.x : \text{Ind} \\ c_{fly} : \text{fly}(x) \end{array} \right]_2 \right\rangle \right\} : \{ (RecType_i, RecType_i) \} \\ \text{probs} = \left\{ P \left( \left[ \begin{array}{l} x = r.x : \text{Ind} \\ c_{fly} : \text{fly}(x) \end{array} \right]_2 \mid r : \left[ \begin{array}{l} x : \text{Ind} \\ c_{bird} : \text{bird}(x) \end{array} \right]_1 \right) = 0.95 \right\} : \{ProbInfo\} \end{array} \right]$$

- (83) *Enthymeme:*

As above, but all variants indexed with **1** are replaced with  $\left[ \begin{array}{l} x = \text{Tweety} : \text{Ind} \\ c_{bird} : \text{bird}(x) \end{array} \right]_1$

The topos contains two nodes, each with an individual: node **1** includes the constraint that individual  $1.x$  is a bird, and node includes the constraint that individual  $2.x$  can fly. There is a single link, from **1** to **2**, which specifies that the individual  $2.x$  in this link is the individual from  $1.x$ . Lastly, the probability information rates  $P(2|1) = 0.95$ , incorporating the restriction from the link that the value of  $2.x$  is specified by  $1.x$ . In the enthymeme,  $1.x$  is given the specific value *Tweety*.

An *Enth* is defined as a *Network* containing a node that has at least one field restricted to a specific object, removing its generality. A *Topos* is a *Network* in which no fields are restricted to a specific object.

An enthymeme  $e$  may be identified with a topos  $t$  if its nodes and links have equivalents in  $t$ , that is if for every node  $x_i \in e.nodes$  there is a corresponding node in  $t$ ,  $\exists y_p \in t.nodes$ , such that  $x_i \sqsubseteq y_p$  and for any links in the enthymeme  $\langle x'_i, x'_j \rangle \in e.links$ , there is an equivalent link between corresponding nodes in the topos, that  $\exists \langle y'_p, y'_q \rangle \in t.links$  such that  $x'_i \sqsubseteq y'_p$  and  $x'_j \sqsubseteq y'_q$ . This may be by a clear match for the topos fields, but may also include the types of fields in the enthymeme as subtypes of fields in the topos<sup>1</sup>.

### 4.3.2 Matching enthymemes, topoi and conditionals

Having reformalised topoi and enthymemes as an object for more complex inferential knowledge, i.e. like a Bayesian network, we turn back to conditionals.

<sup>1</sup>As in the example “Give a coin to the porter, he carried the bags all the way here” from Breitholtz, 2014b, where carrying someone else’s bags is recognised as a subtype of work, and the enthymematic argument is on the basis of a topos like *work should be rewarded*

Firstly, and as mentioned earlier, expressing this kind of relational knowledge is strongly associated with conditionals, and existence of a dependence relation and high conditional probability usually determine their acceptability. Van Rooij and Schulz (2019) suggest a way to combine these two features into a single measure, the relative difference the state of the parent in a relation makes to the likelihood of the child. Pleasingly, with some independence assumptions this measure works not only for the ‘causal’ direction typically expressed by conditionals (*if there’s fire, there’s smoke*), but for the reverse as expressed by evidential conditionals (*if there’s smoke, there’s fire*). However, for it to do so, the direction of the relationship still has to be recognised even when the typical roles of antecedent as parent and consequent as child have flipped. This kind of structural knowledge is topoiic.

Secondly, and while it feels almost trivial to point out, we use conditionals to tell each other new things, e.g. the speaker explaining their school experience to an interviewer with “if you done anything wrong well you get, you get the cane and anything else” (BNC, H5G 78). When we are informed of something through the use of a conditional, we don’t necessarily know beforehand that they lie in such a relation: otherwise they would only be useful to draw attention to connections we haven’t made, not to tell each other things that are entirely new to us. Indeed, Skovgaard-Olsen, Singmann, and Klauer (2016) found evidence that when faced with a conditional, people assume that there is a positive connection between antecedent and consequent unless they have reason to believe otherwise.

Breitholtz (2014a) mentions how an enthymematic argument can be recognised on the basis of the current conversational game/expected rules (with the specific example of knowledge that a suggestion may be followed by the speaker providing a motivation), or by an explicit lexical cue. With the above in mind, I will suggest that use of an *if*-conditional is one such linguistic cue.

### General Principle

The overall suggestion is as follows. *If*-conditionals are associated with the making of enthymeme-like arguments. Note that I say “enthymeme-like arguments”, not “enthymematic arguments”. Enthymemes depend on identification with a previously-known topos, while conditionals can be used to teach new relations, rather than just make statements that rely on existing knowledge to make sense. Although they are structured like the characterisation of enthymemes and topoi above, in this sense they are not all strictly speaking ‘enthymematic’. The content of a conditional can be checked against the topoi in the agent’s resources. Given a match with a topos, an enhanced version can be added to the agent’s knowledge.

Even without a guiding topos, conditionals allow us to express or learn information via an assumption that there is a positive connection between antecedent and consequent. If no supporting topos is found, a more minimal version can be added without the benefit of any extra details a topos might have provided.

The direction of antecedent as parent is ‘default’ in the sense that it should be preferred if distinct topoi in both directions are available, and is the direction assumed in case neither a supporting topos nor a conflicting one is found. The topoi in an agent’s resources may conflict with each other, and by necessity one of them was learned first: despite this, a conditional does not lead to formation of an acceptable enthymeme when such a clashing topos is already present. If there only exists a potential match



for the nodes in a topos that specifies there is definitely no link, then the conditional should be rejected.

The response to a conflicting topos is more complex than it may first appear: because a set of known and accepted topoi may be internally inconsistent, mutually contradictory topoi must be able to co-exist. Whether a contradicting topos should predict rejection or not is an issue which will be discussed briefly at the end of this section. In (86), the conflict check is for a 'hard no', some knowledge the agent will not accept a contradiction of.

The processes of comparing a potential enthymeme with a topos and of updating structured knowledge on the basis of a conditional can be thought of algorithmically as follows:

- (84) *Finding a match between an enthymeme and topos:*  
 Search known topoi for topos with a node matching the first enthymeme node  
*If none:* no match, false.  
*If found:* check topos for nodes matching each further node in enthymeme.  
*If any failure:* resume searching topoi.  
*If found:* check each edge in enthymeme has an equivalent in topos.  
*If any failure:* resume searching topoi.  
*If found:* check any constraints in enthymeme have an equivalent in topos.  
*If found:* match, true.  
*If any failure:* resume searching topoi.
- (85) *Enhancing an enthymeme with a topos:* Make new copy of topos.  
 For each node in topos with an equivalent in enthymeme, add any further specification.  
 For any node in topos with no equivalent node in enthymeme, but with elements also found in a node that was further specified, update accordingly.
- (86) *Updating known topoi with a conditional:*  
 Check for conflicting topos.  
*If found:* reject  
*If not found:* check for topos matching  $ant \rightarrow cons$  equivalent link.  
*If found:* enhance  $ant \rightarrow cons$  and add.  
*If not found:* check for topos matching  $ant \leftarrow cons$  equivalent link.  
*If found:* enhance  $ant \leftarrow cons$  and add.  
*If not found:* add  $ant \rightarrow cons$ .

The following subsections describe dialogue state update rules associated with conditionals, characterised in TTR.

### 4.3.3 Updating the Information State

To begin with, the type of an information state is minimally given as (87), broadly following the decisions for the place of enthymemes and topoi in Breitholtz (2014a) etc.

$$(87) \text{ InfoState} =_{def} \left[ \begin{array}{l} \text{priv} : \left[ \begin{array}{l} \text{Topoi} : \{\text{Topos}\} \\ \text{enths} : \{\text{Enth}\} \end{array} \right] \\ \text{dgb} : \left[ \begin{array}{l} \text{Topoi} : \{\text{Topos}\} \\ \text{Moves} : \text{list}(\text{LocProp}) \end{array} \right] \end{array} \right]$$

$$(88) \text{ Update rule} =_{def} \left[ \begin{array}{l} \text{pre} : \text{InfoState} \\ \text{effects} : \text{Infostate} \end{array} \right]$$

The information state has two parts: the agent's private resources, and their representation of the shared context, the dialogue gameboard. The relevant fields to track are the preceding dialogue moves, and additional fields for invoked enthymemes and topoi. The *private* resources include a set of general topoi which they can use as resources. A public *Topoi* field tracks which topoi have been introduced onto the dialogue gameboard. The general form for context update rules is given in (88): *pre* describes the preconditions for states to which the rule can be applied, and *effects* the relative changes.

Next we will add a few useful functions on the basis of some of the content of Section 4.3.1: *a* means to describe whether there is a successful match between an enthymeme and a topos, and *r* means to reference the result of an enthymeme that has been enriched by the content of a topos.

- (89)  $\text{enthMatch}(e : \text{Enth}, t : \text{Topos}) : \text{Bool}$ , **true** iff all of the following hold
- (i) All  $e$ 's nodes are subtypes of  $t$ 's nodes:  
 $\forall x_i \in e.\text{nodes}, \exists y_p \in t.\text{nodes}$  such that  $x_i \sqsubseteq y_p$ ,
  - (ii) All  $e$ 's links are subtypes of  $t$ 's links:  
 $\forall \langle x'_i, x'_j \rangle \in e.\text{links}, \exists \langle y'_p, y'_q \rangle \in t.\text{links}$  such that  $x'_i \sqsubseteq y'_p$  and  $x'_j \sqsubseteq y'_q$ ,
  - (iii) For any constraints on links in  $e$ , the same constraints hold for equivalent links in  $t$ :  
 $\forall c_{ind_{ij}} \in e, \exists c_{ind_{pq}} \in t$  or  $c_{ind_{qp}} \in t$ ,  
 $x_i \in e.\text{nodes}, y_p \in t.\text{nodes}, x_i \sqsubseteq y_p$  and  $x_j \in e.\text{nodes}, y_q \in t.\text{nodes}, x_j \sqsubseteq y_q$ .  
 Likewise for all  $c_{cause_{ij}} \in e$ , there is an equivalent  $c_{cause_{pq}} \in t$ .

An enthymeme matches a topos if (i) its nodes are subtypes of the topos nodes, (ii) its links are between nodes whose topos equivalents are also linked, and (iii) any constraints between fields of nodes in an enthymeme link also hold for the equivalent topos link.

- (90)  $\text{enhanceEnth}(e : \text{Enth}, t : \text{Topos}) = e' : \text{Enth}$ , such that  $e'$  is an asymmetric merge of  $t$  and  $e$ ,

where the sets in *nodes*, *links* and *probs* undergo asymmetric union such that for any nodes  $x_i \in e.\text{nodes}, y_p \in t.\text{nodes}, x_i \sqsubseteq y_p$ , the corresponding node  $z_u \in e'.\text{nodes} = y_p \sqcup x_i$ .

Likewise for any subtypes  $x'_i$  and  $y'_p, x'_i \sqsubseteq y'_p$  in members of  $e.\text{links}, t.\text{links}, e.\text{probs}$  and  $t.\text{probs}$ .

That is, the asymmetric aspect of the merge is at the level of the indexed nodes, not the fields containing them.

In effect, *enhanceEnth* provides an updated enthymeme with any additional node and link information available in the topos, in such a way that any nodes which are more narrowly specified in the enthymeme keep their more specified fields. This latter means that where  $x : \text{IND}$  is a field in a node of the Topos, but has been restricted to a singleton type  $x : \text{IND}_{\text{mitzi}}$  in the enthymeme, the enhanced enthymeme will retain the specification that  $x : \text{IND}_{\text{mitzi}}$  across the nodes and links.

Update rules are given in the subsections below. Three rules are given: where there is a supporting topos in the causal antecedent-to-consequent direction, where there is not but there is a supporting topos in the evidential consequent-to-antecedent direction, and where there is neither support nor a clash.

### Recognising a supporting topos

First are the update rules for when the agent has a topos linking the two parts of the conditional. The update in case of a supporting topos in the *ant*→*cons* direction is given in (91):

(91) *default direction, ant*→*cons*:

$$\left[ \begin{array}{l} \text{pre : } \left[ \begin{array}{l} \text{Topoi} : \{\text{Topos}\} \\ \text{priv} : \begin{array}{l} t : \text{Topos} \\ c_{\text{member}} : t \in \text{Topoi} \\ c_{\text{def}} : \text{enthMatch}(x : X, t) \end{array} \end{array} \right] \\ \text{dgb : } \left[ \text{LatestMove} = \text{Assert}(\text{if}(a, b)) : \text{LocProp} \right] \\ \text{effects : } \left[ \text{dgb : } \left[ \begin{array}{l} \text{enths} = \text{pre.dgb.enths} \cup \text{enhanceEnth}(x : X, t) : \{\text{Enth}\} \\ \text{Topoi} = \text{pre.dgb.Topoi} \cup \text{pre.priv.t} : \{\text{Topos}\} \end{array} \right] \right] \end{array} \right]$$

where  $X$  is the type

$$\left[ \begin{array}{l} \text{nodes} = \{ \langle \text{a.sit-type}_1, \text{b.sit-type}_2 \rangle : \text{RecType}_i \\ \text{links} = \{ \langle \langle \text{a.sit-type}_1, \text{b.sit-type}_2 \rangle \rangle : \langle \text{RecType}_i, \text{RecType}_i \rangle \\ \text{probs} = \{ \text{P}(\text{b.sit-type}_2 | \text{r} : \text{a.sit-type}_1) = 0.95 \} : \text{ProbInfo} \end{array} \right]$$

The precondition state specifies that this update may be applied following assertion of a conditional, where an agent knows some topos  $t$  that matches an enthymeme  $x$  based on the content of the conditional, with a link from antecedent to consequent. In this case, the update specifies that the agent should add such an enthymeme, enhanced with the topos, to the *enths* in the common ground, and likewise add the underlying topos to the set of currently active topoi in the conversation.

Where a supporting topos in the *ant*→*cons* direction is not found, a topos with only a link from consequent to antecedent can be used, as described in (92). The enthymeme added to *enths* in this case will contain a link only in the *ant*←*cons* direction.

(92) *alternative direction, ant*←*cons*:

$$\left[ \begin{array}{l} \text{pre : } \left[ \begin{array}{l} \text{dgb : } [\text{LatestMove} = \text{Assert}(\text{if}(a, b)) : \text{LocProp}] \\ \text{Topoi} : \{\text{Topos}\} \\ t : \text{Topos} \\ \text{priv : } \left[ \begin{array}{l} c_{\text{member}} : t \in \text{Topoi} \\ c_{\text{no-def}} : \nexists t', t' \in \text{Topoi} \wedge \text{enthMatch}(x : X, t') \\ c_{\text{alt}} : \text{enthMatch}(y : Y, t) \end{array} \right] \end{array} \right] \\ \text{effects : } \left[ \begin{array}{l} \text{dgb : } \left[ \begin{array}{l} \text{enths} = \text{pre.dgb.enths} \cup \text{enhanceEnth}(y : Y, t) : \{\text{Enth}\} \\ \text{Topoi} = \text{pre.dgb.Topoi} \cup \text{pre.priv.t} : \{\text{Topos}\} \end{array} \right] \end{array} \right] \end{array} \right]$$

where  $X$  is as defined in (91), and  $Y$  is the type

$$\left[ \begin{array}{l} \text{nodes} = \{a.\text{sit-type}_1, b.\text{sit-type}_2\} : \text{RecType}_i \\ \text{links} = \{(b.\text{sit-type}_2, a.\text{sit-type}_1)\} : \{\langle \text{RecType}_i, \text{RecType}_i \rangle\} \\ \text{probs} = \{P(a.\text{sit-type}_1 | r : b.\text{sit-type}_2) = 0.95\} : \{\text{ProbInfo}\} \end{array} \right]$$

Relative to (91), the update rule for this case has an additional constraint in its preconditions that there are no topoi with a link in the *ant*→*cons* direction, and the enthymeme is instead enhanced by a topos that supports a link in the *ant*←*cons* order.

The following is a simplified example using this second *alternative order* rule for evidential conditionals, without dealing with tense, time or pronoun resolution. For readability, members of *links* and *probs* are referenced by their index in *nodes* bolded.

Below are illustrations of what should be understood from the evidential conditional "If the glass fell, the cat pushed it", given knowledge of a topos equivalent to *if someone pushes something, the thing falls*.

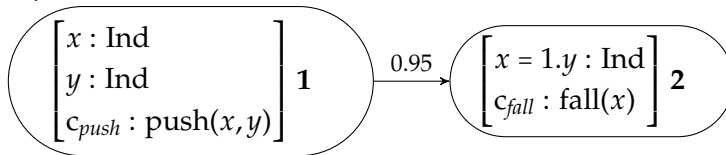
(93) *Ant. content:*

$$\left[ \begin{array}{l} x = \text{obj}_g \\ c_{\text{glass}} = \text{glass}(\text{obj}_g) \\ c_{\text{fall}} = \text{fall}(\text{obj}_g) \end{array} \right]$$

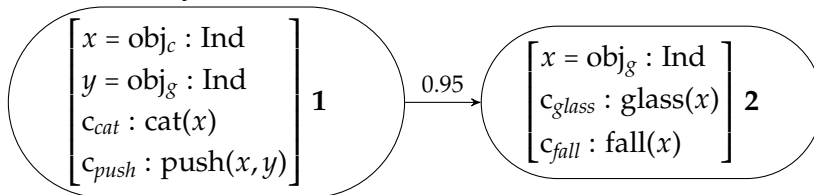
(94) *Cons. content:*

$$\left[ \begin{array}{l} x = \text{obj}_c \\ y = \text{obj}_g \\ c_{\text{cat}} = \text{cat}(\text{obj}_c) \\ c_{\text{push}} = \text{push}(\text{obj}_c, \text{obj}_g) \end{array} \right]$$

(95) *Topos:*



(96) *Enhanced enthymeme:*



We will now step through this process.

In the information state of type  $i$  in (97), the agent has amongst their resources a topos connecting a situation type **1**, where some  $x$  pushes  $y$ , to a situation type **2**, where the pushed  $y$  falls. The direction of inference in this topos is from **1** to **2**. In the public part of the information state, i.e. the dialogue gameboard, the latest move is that a speaker has just asserted that "If the glass fell, the cat pushed it". For purposes of illustration, we assume the agent has identified the specific cat and glass involved in the incident as  $obj_c$  and  $obj_g$  respectively.

(97) "If the glass fell, the cat pushed it."

Type of  $i$  : *InfoState*, a candidate for the second update rule

$$\left[ \begin{array}{l} \text{private :} \\ \text{dgb :} \end{array} \left[ \begin{array}{l} \text{Topoi} = \left\{ \left[ \begin{array}{l} \text{nodes} = \left\{ \left[ \begin{array}{l} x : \text{Ind} \\ y : \text{Ind} \\ c_{push} : \text{push}(x, y) \end{array} \right] \mathbf{1}, \dots \right\} \\ \left[ \begin{array}{l} x = 1.y : \text{Ind} \\ c_{fall} : \text{fall}(x) \end{array} \right] \mathbf{2} \end{array} \right\} \\ \text{links} = \langle \mathbf{1}, \mathbf{2} \rangle \\ \text{probs} = \{P(\mathbf{2}|r : \mathbf{1}) = 0.95\} \end{array} \right. \\ \left. \begin{array}{l} \text{LatestMove} = \\ \text{Assert} \left( \text{if} \left( \left[ \begin{array}{l} \text{sit} = \left[ \begin{array}{l} x = obj_g \\ c_{glass} = \text{glass}(obj_g) \\ c_{fall} = \text{fall}(obj_g) \end{array} \right] \\ \text{sit-type} = \left[ \begin{array}{l} x : \text{Ind} \\ c_{glass} : \text{glass}(x) \\ c_{fall} : \text{fall}(x) \end{array} \right] \end{array} \right) \left[ \begin{array}{l} \text{sit} = \left[ \begin{array}{l} x = obj_c \\ y = obj_g \\ c_{cat} = \text{cat}(obj_c) \\ c_{push} = \text{push}(obj_c, obj_g) \end{array} \right] \\ \text{sit-type} = \left[ \begin{array}{l} x : \text{Ind} \\ y : \text{Ind} \\ c_{cat} : \text{cat}(x) \\ c_{push} : \text{push}(x, y) \end{array} \right] \end{array} \right) \right) \end{array} \right. \end{array} \right]$$

The situations described by the antecedent and consequent are subtypes of the nodes in the push-fall topos in the agent's resources. The antecedent is a subtype of node **2**, with additional specification that the falling  $x$  is a glass, while the consequent is a subtype of node **1**, with additional specification that the pushing  $x$  is a cat. Use of an enthymeme based on this topos can be identified.

The dialogue gameboard can then be updated with recognition of an enthymematic argument based on this push-fall topos.

(98) Type of  $i'$  : *InfoState*, the result of applying the  $ant \leftarrow cons$  update rule to  $i$

$$\left[ \begin{array}{l} \text{dgb} : \\ \text{enths} = i.\text{dgb}.\text{enths} \cup \\ \text{Topoi} = i.\text{dgb}.\text{Topoi} \cup \end{array} \left[ \begin{array}{l} \text{nodes} = \left\{ \begin{array}{l} \left[ \begin{array}{l} x = \text{obj}_c : \text{Ind} \\ y = \text{obj}_g : \text{Ind} \\ c_{cat} : \text{cat}(x) \\ c_{push} : \text{push}(x, y) \end{array} \right] \mathbf{1}, \\ \left[ \begin{array}{l} x = \text{obj}_g : \text{Ind} \\ c_{glass} : \text{glass}(x) \\ c_{fall} : \text{fall}(x) \end{array} \right] \mathbf{2} \end{array} \right\} \\ \text{links} = \langle \mathbf{1}, \mathbf{2} \rangle \\ \text{probs} = \{P(\mathbf{2}|r : \mathbf{1}) = 0.95\} \end{array} \right] : \{ \text{Enth} \} \\ \left[ \begin{array}{l} \text{nodes} = \left\{ \begin{array}{l} \left[ \begin{array}{l} x : \text{Ind} \\ y : \text{Ind} \\ c_{push} : \text{push}(x, y) \end{array} \right] \mathbf{1}, \\ \left[ \begin{array}{l} x = 1, y : \text{Ind} \\ c_{fall} : \text{fall}(x) \end{array} \right] \mathbf{2} \end{array} \right\} \\ \text{links} = \langle \mathbf{1}, \mathbf{2} \rangle \\ \text{probs} = \{P(\mathbf{2}|r : \mathbf{1}) = 0.95\} \end{array} \right] : \{ \text{Topos} \} \end{array} \right]$$

The push-fall topos is added to the set of topoi in the common ground. The enthymeme identified is a more specified version of this topos, with nodes which are subtypes of the topos nodes. Node 1 of the enthymeme is restricted to  $x$  and  $y$  as  $\text{obj}_c$  the cat and  $\text{obj}_g$  the glass respectively, and contains an additional field specifying that  $\text{obj}_c$  is a cat. Node 2 of the enthymeme is restricted to  $\text{obj}_g$  as the falling object, and contains an additional field specifying it as a glass.

### New information

The last update rule provided describes the case where the agent's known topoi have neither evidence about a link between the antecedent or consequent, the definite absence of one, or a conflicting one. In this case, an 'enthymeme' with a link in the *ant*→*cons* direction may be added to *enths* solely on the basis of the conditional content. Only a copy of the accepted enthymeme is added to the list of active topoi – the process for generalising an acceptable enthymeme to a re-usable topos is not addressed here.

Recall that earlier we mentioned that the question of clashing topoi is complex, as contradictory topoi may be acceptable to a single speaker. As indicated there, the discussion of clashing here relies on a temporary assumption that some elements can be designated as firm beliefs for which the speaker rejects contradiction, but this requires a more complex treatment and representation. The shorthand for presence of a clashing topos is given in (99) as *enthClash*. An enthymeme clashes with a topos where the equivalent parent nodes lead to mutually exclusive child nodes, i.e. child nodes where a true type cannot be formed from their meet.

$$(99) \quad \text{enthClash}(e : \text{Enth}, t : \text{Topos}) : \text{Bool}, \text{true iff}$$

$$\begin{aligned}
& \exists x_i, y_j \in e.nodes, p_i, q_j \in b.nodes, x_i \sqsubseteq p_i, \\
& \exists \langle x'_i, y'_j \rangle \in e.links, x'_i \sqsubseteq x_i, y'_j \sqsubseteq y_j, \\
& \exists \langle p'_i, q'_j \rangle \in t.links, p'_i \sqsubseteq p_i, q'_j \sqsubseteq q_j, \\
& \text{and } \neg T, \text{ where } T = y'_j \wedge q'_j
\end{aligned}$$

With this additional check available, an update where an an argument is accepted

(100) *neither support nor opposing knowledge:*

$$\left[ \begin{array}{l} \text{pre :} \\ \text{effects :} \end{array} \left[ \begin{array}{l} \text{dgb :} \left[ \text{LatestMove} = \text{Assert}(\text{if}(a, b)) : \text{LocProp} \right] \\ \text{priv :} \left[ \begin{array}{l} \text{Topoi} : \{ \text{Topos} \} \\ c_{no-clash} : \nexists t, t \in \text{Topoi} \wedge \text{enthClash}(x : X, t) \\ c_{no-def} : \nexists t, t \in \text{Topoi} \wedge \text{enthMatch}(x : X, t) \\ c_{no-alt} : \nexists t, t \in \text{Topoi} \wedge \text{enthMatch}(y : Y, t) \\ c_{no-ind} : \nexists t, t \in \text{Topoi} \wedge \text{enthMatch}(z : Z, t) \end{array} \right] \\ \text{priv :} \left[ \text{Topoi} = \text{pre.priv.Topoi} \cup x : \{ \text{Topos} \} \right] \\ \text{dgb :} \left[ \begin{array}{l} \text{enths} = \text{pre.dgb.enths} \cup x : \{ \text{Enth} \} \\ \text{Topoi} = \text{pre.dgb.Topoi} \cup x : \{ \text{Topos} \} \end{array} \right] \end{array} \right]
\right]$$

where  $X, Y$  are as in (91), (92), and  $Z$  is the type

$$\left[ \begin{array}{l} \text{nodes} = \{ \text{a.sit-type}_1, \text{b.sit-type}_2 \} : \text{RecType}_i \\ \text{links} = \emptyset : \{ \langle \text{RecType}_i, \text{RecType}_i \rangle \} \\ \text{probs} = \emptyset : \{ \text{ProbInfo} \} \\ c_{ind_{12}} : \neg \text{predecessor}(1, 2, \text{links}) \wedge \neg \text{predecessor}(2, 1, \text{links}) \end{array} \right]$$

Relative to the previous two update rules, the preconditions in this rule specify that there is no known topos that supports an enthymeme with a link between the antecedent and consequent in either direction, or which has an explicit constraint enforcing independence between the two, or which otherwise clashes with the possible conditional enthymeme.

#### 4.3.4 A word on contradictory topoi

Interaction with contradictory topoi is more complex than the treatment above. As mentioned, an important feature of topoi is that an agent's set of known and usable topoi may be internally inconsistent. We should also be able to distinguish between a response to incoherence, and rejection of a recognised (but unacceptable) argument. There is also the question of learning: in addition to inducing entirely new topoi, it should be possible to re-evaluate existing topoi in the knowledge base through belief revision. For a potential new topos which clashes with a topos in the knowledge base then, there are multiple possible branches:

- *Do not induce topos and reject:* No new element added to agent's known topoi, speaker's attempt at use is rejected.

- *Induce topos but reject*: Add a new element to the set of known *Topoi*, but refuse to admit it into the common ground, objecting to the speaker.
- *Induce topos and accept*: Add a new element to the set of known *Topoi* and accept, adding it to the common ground.
- *Induce topos, revise pre-existing, and accept*: Add a new element to the set of known *Topoi*, revise attitude to a known clashing topos in *Topoi*, add new topos to the common ground.

Recognition and acceptance were conflated earlier by making the assumption that recognition of a clashing topos would go hand in hand with refusing its admittance into the common ground. However, a topos may be accepted into the common ground even if it does contradict another topos the agent accepts, and a topos may be recognised but rejected as unacceptable, distinguishing between rejection for complete incoherence and rejection as a known invalid argument.

A possible approach to accounting for these paths within the model is to enrich the topos representation in various ways. An explicit belief metric, perhaps through more serious treatment of the already-included probability field, may allow for disbelieved topoi to nevertheless be recognised and included in the agent's knowledge base. Distinction between whether conflicting evidence is neutral (i.e. results in no clash), prompts revision of the existing topos, or is itself rejected. This may be approached through something like a metric for belief centrality, as in literature on the psychological immune system literature (see Porot and Mandelbaum (2021) for a short overview), whereby an agent's central beliefs outrank conflicting evidence, resulting in rejection of threats to core beliefs. This is a more general issue, which also applies to more typically represented propositional beliefs.

The potential to induce discursively unacceptable topoi in the knowledge base also complicates the checking procedure, as a recognisable topos can be refused admission to the common ground, so the recognition and acceptance processes must be distinguished, with acceptance should including reference to the agent's regard for the topos. For rejection of an argument on the basis of a clash with another topos, it needs to be possible to designate a topos as a core belief for which the agent resists contradiction.

## 4.4 Conclusion

The acceptability of a conditional is often determined by the conditional probability of the consequent on the antecedent, and recognition of some meaningful link between the two. However, both intuitively and according to experimental evidence, positive acceptability judgements can still be made without fore-knowledge of such a connection.

In this chapter I have provided an analysis of the role of conditionals in argument in dialogue, an aspect which eludes existing accounts of conditionals as it requires explicit interface with a conversational context. I presented two proposals on the basis that the knowledge enabling these acceptability judgements is topoi, integrating these factors into the representation of the dialogue state and agent resources. First, a formalisation of enthymemes and topoi as graphs was presented, on the grounds that they should be in the same form as other relational knowledge. Second, update rules



for conditionals using topoi and enthymemes were presented, drawing on topoi to recognise the presence and direction of a 'meaningful' connection between antecedent and consequent, and potentially inducing a new topos in the absence of any conflicting evidence.

The account developed here addresses the argument function of conditionals in dialogue, and the discussion primarily addressed hypothetical conditionals, both causal and evidential. However, it could in principle be expanded to non-hypothetical conditionals, including overtly metalinguistic conditionals. To do so, one must allow for recognised arguments not based directly on the content of the antecedent and consequent, but potentially in a higher-level relationship between them, such as one situation furthering a goal implied by the other, or as justification for a metalinguistic aspect of the utterance itself. Questions about whether or not these aspects should be handled in relation to structural knowledge, and questions about whether such metalinguistic topoi should be considered lasting members of the common ground following a metalinguistic comment, are issues which require future consideration.

## Chapter 5

# Variation in *if*-conditionals

### 5.1 Introduction

Formal semantics for conditionals is mostly concerned with hypothetical conditionals, with some additional work on biscuit conditionals and a small amount of attention on adnominal conditionals. Non-hypothetical conditionals, for practical reasons, are usually left out of scope from the outset. Their truth conditions are difficult to judge, and there is a strong intuition that the antecedent condition of biscuit conditionals is unrelated to the content of the consequent. As they appear to need some special treatment or a non-trivially different analysis, relating them to an analysis of hypothetical conditionals is its own task. When it comes to working in the biscuit-to-hypothetical direction meanwhile, treatments of ‘speech act’ conditionals have been criticised as unsuitable for extension to hypothetical conditionals (see e.g. Lycan, 2006). More syntactically-oriented analyses do tend to situate non-hypothetical in relation to classic conditionals (e.g. in the vein of Iatridou, 1991), and non-formal work on non-hypotheticals often refers to non-content elements e.g. actualisation or felicity of speech acts, or existence of speech events.

Consider the following examples:

- (101) Oh here’s some Marmite crisps if you want any? (KPK 96)
- (102) Looks a bit lethargic if you ask me. (KP4 235)
- (103) Was there ever a moment when you f when you were striking the (laughing):[bargain ] if one could call it that, [...] when you when you knew that he’d got you by the short and curlies? (HEN 193-195)<sup>1</sup>
- (104) The location if it rains and the location if it doesn’t rain are within five miles of each other. (from Lasersohn (1996))

Example (101) is a typical biscuit conditional: it has the same form as a hypothetical conditional, but without an implied connection between the truth of its two parts. The second example is generally considered either a subtype or cousin of the first, since it similarly lacks the sense of a truth-connection, but it appears more overtly metalinguistic thanks to the specific content of the *if*-clause. In (102) the *if*-clause is connected to “looks a bit lethargic”: its consequent is still a (mostly) complete clause with propositional content. Intuitively, (103) does something similar, but the subutterance “bargain” is at least as intuitive a consequent as the entire clause, despite being sub-propositional. I will argue that (103) is also distinct from the *if*-clause use in

<sup>1</sup>All examples from ICE-GB are cited via the data released at [http://www.chiheelder.com/?attachment\\_id=144](http://www.chiheelder.com/?attachment_id=144)

the constructed example (104), which contains adnominal conditionals “the location if it rains” and “the location if it doesn’t rain”.

Examples like (103) have been mentioned elsewhere under the name of meta-textuals, and discussed in relation to the broader class of biscuit conditionals. We analyse this as a metalinguistic usage of *if*-clauses being applied to sub-clausal elements, not to whole clauses, but distinct from true adnominal *if*-clauses, and show that despite this, they can be handled in line with other *if*-conditionals.

I will refer to this particular subset as *lexical hedges* (hereafter *LHs* for short), to distinguish them from full-clause metalinguistic hedges like (102). We can distinguish them from the more general metalinguistic class by how they target a particular phrase or lexical item within the utterance rather than the whole sentential unit. This is the contrast between (102) and (103): the first targets the entire statement “Looks a bit lethargic”, while the second targets “bargain”. As an additional convention, the utterance segment associated with the *if*-clause will be referred to as the *target* rather than the *consequent*. This is to reduce conflation when it comes to just what aspect the *if*-clause affects once we start discussing different meaning components, and the utterance as a whole (rather than just its semantic content).

A consistent analysis of conditionals should be applied to these – if not entirely identical, then one at least derived from the compositional content-based *if*-conditional. In this chapter, we can draw from (non-formalised) work on the general phenomenon of insubordination to do so.

I will argue that even in full-clause cases, semantically they are not hypothetical conditionals, but do nevertheless operate in fundamentally the same way. As repeated in both syntactic and non-formalised analyses, the ‘consequent’ is non-semantic discourse matter: the problem thus far has been combining this with an adequate model of discourse. Having chosen a framework which accommodates a rich context representation, we will do so here.

The remainder of the chapter is structured as follows.

Section 5.2 gathers perspectives and resources we can use to address this phenomenon, first within the conditional literature, and then outside it. Identifying biscuit and metalinguistic full-clause conditionals and adnominal conditionals as the most similar conditional phenomena to LHs, existing analyses of these are examined as possible candidates in sections 5.2.1 and 5.2.2. From other literature, relevant notions can be found in informal literature on insubordination in section 5.2.3, and in formal dialogical accounts of utterance repair in section 5.2.4.

With this perspective, LHs themselves are addressed in section 5.3 LH data is examined more closely in section 5.3.1 to conclude that they are not trivially handled by either existing metalinguistic conditional or adnominal conditional accounts. Instead, they can be accounted for in section 5.3.2 through a parallel with utterance repair, and functional extension.

Finally, having brushed against consequentless and adnominal *if*-clauses in this process, the chapter concludes with additional comment on their analysis in section 5.4. The functioning of stand-alone *if*-clauses can be identified with their functions as part of more typical *conditionals* – even if conventionalised, these functions can be traced to *if*-clauses *in situ* (contra Kaltenböck (2016), who suggested that while directive *if*-clauses may be partly descended from conditional *if*-clauses, they were ultimately distinct). In line with the previous argument for *if*-clauses and non-content elements, we will re-analyse adnominal conditionals without adding an operator.

## 5.2 Useful perspectives

### 5.2.1 Biscuit and metalinguistic conditionals

Biscuit conditionals are difficult to delimit as a group, but can broadly be considered the subset of conditionals that intuitively lack a direct connection between the antecedent and consequent states. The three names most commonly used are speech act conditionals, relevance conditionals, and biscuit conditionals: the first two are motivated by analyses of their core function, while the third merely references the best-known example. Part of the reason I use *biscuit conditional* here is for its neutrality in this respect, and because it provides a term to gather all variants under one umbrella, without excluding those which do not seem interpretable as either a condition for the consequent's relevance or a condition for a speech act.

While most attention is paid to 'classic' biscuit conditionals like (101), other related uses – including more explicitly metalinguistic uses – have drawn some attention, though the name for the parent group (if one is used) varies.

Quirk et al. (1985) divide English conditionals (not only those realised by *if*-clauses) into those providing *direct* and *indirect* conditions. The indirect conditions are classed among other 'style disjuncts', disjuncts which refer to "the circumstances of the speech act", and split into four classes. One of these is (one analysis of) classic biscuit conditionals, described as providing conditions under which the speaker makes the utterance: the other three are (i) expressions of politeness, framing the utterance as dependent on the hearer (e.g. *If I may say so*), (ii) expressions of uncertainty (whether the speaker's or the hearer's) about extra-linguistic knowledge to correctly interpret the consequent (e.g. *If you remember*), and (iii) metalinguistic comments that hedge the wording of the utterance, "either suggesting that the wording is not quite precise or that it should not be misunderstood in some sense not intended by the speaker."

Dancygier (1992) distinguishes 'metatextual' conditionals like (102) and (103), from speech-act conditionals like (101), grouping them under the banner of *conversational conditionals*. The whole clause is discussed as the "consequent" in both cases, including the (103)-like examples. Dancygier's copious use of scare quotes when discussing metatextuals implies discomfort with assessing the entire clause as consequent, but the alternative that the consequent is the 'focus' segment itself, rather than the entire surrounding clause, is not followed through on. The analysis that an entire utterance must be reinterpreted as a conditional due to a comment on a single word is a high cost. As will be illustrated below, this can only really be argued for as a matter of principle for avoiding sub-clausal consequents, in order to always retain a complete speech-act/clause consequent in the analysis, rather than on the basis of the data itself.

Declerck and Reed (2001) extensively catalogue variety in English conditionals (whether using *if* or not) by several metrics. In terms of function, the primary divide they recognise is between what they call *case-defining* and *rhetorical* conditionals, biscuit conditionals (amongst other things) falling into this second category. Rhetorical conditionals are divided into five groups, which are further subdivided into even more specific functions. While some of their their categorisations seem flawed,<sup>2</sup> it would not be productive to attempt an extended discussion here. Nevertheless, when

<sup>2</sup>See the example from earlier: *If you are thirsty, there's some beer in the cellar* as an example of a *relevance/speech act/pragmatic conditional*, while *If the lights go out, I have candles in this cupboard* is explicitly mentioned as *mischaracterised* as a relevance conditional.

it comes to what we are terming *lexical hedges*, they do recognise *metalinguistic-P conditionals*, which comment on “the form of the Q-clause [consequent-clause], on the choice of words in it or on the pronunciation of a word”, although they do not make an extended analysis, given the work’s encyclopaedic aim.

Elder (2015) argues that most classifications of conditionals boil down to whether the antecedent and consequent cases are ‘directly’ or ‘indirectly’ connected, but that this is ultimately unhelpful when trying to understand their usage. What might elsewhere be classed broadly as being biscuit conditionals are divided between three groups of *if*-clause function: *topic markers*, *propositional content hedges* and *illocutionary force hedges*. With regard to our particular object of interest, she makes a specific corpus case study of *if you like* used metalinguistically, but otherwise includes lexical hedges amongst other metalinguistic conditionals which function as an *illocutionary force hedge*.

In general the proposals for handling biscuit conditionals can be divided into semantic and pragmatic. Semantic proposals generally rest on the idea that instead of conditioning truth, the *if*-clause of biscuit conditionals conditions the status of a speech act in some way.

Among the semantic approaches, particularly among (relatively) older proposals like Iatridou (1991), a syntactic solution is sometimes explicitly put forward as the underlying mechanism. This incorporates the Performative Hypothesis due to Ross (1967), whereby the performance of a speech act is part of the clause structure, with a covert ‘performative prefix’ scoping over the sentence. Depending on the interpretation of the conditional, this is placed at a different level in the structure, with the difference producing the contrasts between biscuit and other conditionals. The original version of the Performative Hypothesis has been essentially disproven, but new research in the same spirit has arisen more recently (such as Rizzi, 1997; Cinque, 1999; Ambar, 2003; Hill, 2007; Haegeman, 2014). Speas and Tenny (2003) in particular returned this approach to more mainstream thinking, and take as their premise the claim that “syntactic structures include a projection whose head encodes illocutionary force”. They explicitly reject Ross’ (1967) original proposal that these projections were literal representations of specific speech acts (Speas and Tenny, 2003, p. 317). However, LHs relate to sub-clausal segments: any explanation that relies on the *if*-clause interfacing with something which scopes over the clause will be of no use here. Using a performative prefix as the basis for non-hypothetical conditionals would require that full-clause metalinguistic conditionals and LHs operate in distinct ways.

On a more principled level, we follow Ginzburg (2012) in taking an explicitly dialogical view of illocutionary force in the grammar. Rather than a component of syntactic structure, we identify illocutionary force as being part of the semantics associated with certain lexical items, phrases and clause types, reflecting the action a speaker of the utterance believes themselves to have performed in uttering it. Differences in underlying assumptions aside, the work by Mayol and Castroviejo (2017) offers an information-structure solution for at least some of the distinctions that Iatridou used the performative prefix to account for.

Not all proponents of a semantic analysis make specific claims as to how it operates (e.g. Sweetser, 1990). Related to the covert performative prefix above, it might be argued that as a case of ellipsis (101) is in fact [*I assert/tell you that*] *here’s some Marmite crisps, if you want any*. The ability to paraphrase does not prove that the original material is ‘actually’ the paraphrase, but even if this were the case, it would still fall victim to the objections against covert performatives generally.

Other semantic proposals (e.g. Auwera, 1986) do not explicitly tie the performance of a speech act to the syntactic structure. Without tying it to a covert syntactic element, biscuit conditionals are analysed as conditioning a consequent speech act, typically assertion of the consequent content. Again, however, LHs affect sub-utterances below the level that provides content for an assertion.

Apart from its unsuitability for scaling down, conditioning a consequent speech act comes with its own set of issues. If it is meant to be a condition on the performance of a speech act (that is, the act is performed when the *if*-case is true), this raises some problems. The *if*-clause may reference the future, e.g. *if you're hungry later, there's pizza in the fridge*. Although the example itself appears natural, it is odd to suppose that assertion of the consequent should be considered 'on-hold' until a future point for which the speaker may not even be present. There is also the complication that biscuit conditionals do not necessarily entail their consequents. Given the right content and context, a biscuit conditional may contain a blatantly false consequent without issue: Siegel (2006) mentions the example *If you want to hear a big fat lie, George W. Bush and Condoleezza Rice are married*.

Siegel (2006) identifies the issues above and offers an alternative take on a semantic solution, proposing that biscuit conditionals in fact express existential quantification over "potential literal acts" i.e. potential assertions, questions, etc. Although it addresses the various issues that she identifies for other semantics-based proposals, it results in such a significant semantic gulf between hypothetical and biscuit conditionals that a simpler solution is preferable if possible.

With this in mind, we turn to pragmatic solutions. Pragmatic answers to the biscuit conditional problem generally (at least partly) attribute the differences to the recognition of independence between antecedent and consequent for biscuit conditionals (e.g. Franke, 2009; Csipak, 2015; Lauer, 2015).

The work by Biezma and Goebel (2019) builds on this previous pragmatic-solution literature, identifying inferences found for biscuit conditionals with discourse effects triggered by other means (in particular, question-answer pairs). To do this, they combine (i) the explicit inclusion of rule-like world knowledge in the model with (ii) a mapping from the relation of antecedent and consequent to a question-answer relation. The sub-clausal nature of LHs makes them unusual again, however, as they can apply to utterance segments with content which cannot be non-metalinguistically combined with an *if*-clause.

### 5.2.2 Adnominal *if*-clauses: clues?

Adnominal *if*-clauses are a case study in *if*-clauses applied to a 'consequent' which is merely a constituent within the clause, and which does not contribute a proposition, question or imperative to the context, or otherwise itself provide the basis for an illocutionary act.

Lasnik (1996) was the first to remark on adnominal conditionals, arguing that they were genuinely a sub-sentential NP-modifier, and providing a semantic analysis based on the Lewis-Stalnaker counterfactual.

- (105) a. *Lasnik's adnominal*: Relative to possible world  $w$  and model  $M$ ,  

$$\llbracket N \text{ if } S \rrbracket^{M, w} = \{x \in U \mid \text{for all those worlds } w' \text{ closest to } w \text{ such that } S \text{ is true in } w', x \in \llbracket N \rrbracket^{M, w'}\}$$

- b. **The head of accounting if Campbell gets fired** is currently working for a competitor in London.<sup>3</sup>
- c.  $\llbracket \text{The head of accounting if Campbell gets fired} \rrbracket^{M, w} = \{x \in U \mid \text{for all those worlds } w' \text{ closest to } w \text{ such that } \textit{Campbell gets fired} \text{ is true in } w', x \in \llbracket \text{the head of accounting} \rrbracket^{M, w'}\}$

Where  $N$  denotes individuals in current world  $w$ , then, the adnominal conditional  $N$  if  $S$  denotes the individuals as denoted by  $N$  in the closest  $S$  worlds. Rather than being treated as a proposition with a truth value depending on truth of the consequent in the *if*-case, the adnominal use remains nominal, with its denotation pending the consequent's denotation in the *if*-case. The directness of the analysis and its clear relationship to clausal conditionals is very appealing – the account of conditionals on which it was based, however, has since fallen from favour over its inability to manage adverbials. Frana (2017) identifies that this adnominal analysis falls victim to the same trouble when it comes to NPs containing a modal operator.

Frana (2017) subsequently updated Lasersohn's proposal, adapting it to the modern Lewis-Kratzer-Heim restrictor analysis of *if* and expanding its coverage to include NPs with modal operators such as *the necessary precautions*. In parallel to the restrictor approach to standard conditionals, she considers NPs with overt modal adjectives, such as *the possible options*, to be the base case. For NPs without an overt modal adjective, she argues for the presence of a covert epistemic necessity modal adjective (similar to *necessary*) which can then be restricted by the *if*-clause.

However, Csipak (2017) cites German data as evidence against the covert modal analysis of adnominal *if*-clauses. Various adverbials and discourse particles can occur in German APs, and cannot occur in DPs without an adjective present. It turns out that, despite the theorised covert adjective, these adverbials and discourse particles cannot occur in adnominal conditionals without overt adjectives. Once an overt adjective is introduced, the adnominal becomes acceptable. It appears, then, that the theorised covert adjective is likely not present after all. Csipak's own analysis is more promising.

It can be summarised as follows. Csipak focuses on a distinction (following Donnellan, 1966) between referentially- and attributively-used descriptions, and in particular on the notion that referentially used definite descriptions comprise (i) a reference and (ii) a presupposition that the description applies to the referent.

She proposes that the adnominal *if*-clause applies only to this descriptive content, which she characterises as modal. More specifically, she characterises it as epistemically modal, adapting a partial formalisation by Heim (2011) of Stalnaker's 1970 interpretation of Donnellan's work:

- (106) *Csipak's definite referential description:*  
 $\llbracket \textit{the}_{ref} \alpha \rrbracket = \iota x \bullet \forall w' \in \textit{Best}(\cap f(w)) : \alpha(x) \text{ in } w'$

The descriptive content is considered epistemically modal, equivalent to the speaker presupposing that in all their best epistemically available worlds, referent  $x$  counts as an  $\alpha$ . She also distinguishes between truth-conditional and non-truth-conditional material (not-at-issue material to the right of  $\bullet$ ) in a multi-dimensional semantics, based on Potts (2007). Because this descriptive content now involves a modal, it can then be modified by a restrictor *if*-clause:

<sup>3</sup>example originally from Frana (2017)

- (107) a. *Csipak's adnominal*:  $\iota x \bullet \forall w' \in \text{Best}(\cap f(w) \cup S) : \alpha(x)$  in  $w'$   
 b.  $\iota x \bullet \forall w' \in \text{Best}(\cap f(w) \cup \text{fired}(\text{Campbell})) : \text{head-of-accounting}(x)$  in  $w'$

The reference to  $x$  is unaffected by the addition of the *if*-clause, but the descriptive content is now only presupposed to hold where the *if*-case obtains. Rather than proposing a new covert item, Csipak's analysis only requires treating an existing component of meaning as epistemic in nature.

This is further expanded into other descriptions (i.e. attributive definite descriptions, and indefinite descriptions). We will continue to focus on LHs for now, and return to the analysis of adnominal conditionals later. In particular, relating the *if*-clause to an aspect other than the target's at-issue content is an insight we can carry forward.

### 5.2.3 Insubordination

Over the last ten years or so interest has grown with respect to *insubordination*<sup>4</sup>, defined by Evans (2007), who coined the term, as "the conventionalized main clause use of what, on *prima facie* grounds, appear to be formally subordinate clauses". The best-recognised example of this may be the directive conditional clause, as in (108), a use of conditional clauses that has been attested across several languages.

- (108) Just if you take this just about an hour before er bedtime. (*H5M 56*)

Directive *if*-clauses are not the only *if*-clauses to be (deliberately)<sup>5</sup> used without explicit consequents, as in the following examples:

- (109) *Sarah*: Shall I do it in capitals?  
*John*: If you, if you wish. (*G4K 115–6*)
- (110) *Cassie*: Oh right I see. ⟨sings⟩  
*Catherine*: If I hear that bloody one more time.  
*Cassie*: Yeah what you gonna do about it darling? (*KP4 604–6*)

In the first example, the *if*-clause provides an answer to the preceding polar question, rather than co-construction of a conditionalised question. In the second, the *if*-clause is used to make an (apparently unconvincing) threat.

Insubordinate *if*-clauses have been documented with various functions, and more metadiscursive uses (e.g. those called "conversational *if*-clauses" by Dancygier, 1998) have been retrospectively identified as cases of insubordination (see discussion below) – but this insubordination literature has not been connected with formal semantic accounts of *if*.

Two primary paths to insubordination have been recognised: ellipsis (i.e. gradual erosion of the main clause) and extension (i.e. adaptation of the subordinate clause's function to higher level discourse elements). Through these avenues (and a heterogeneous representation of discourse context), it is possible to make non-hypothetical conditionals and lone *if*-clauses more explicitly connected to the majority of formal semantic work on *if*. This second is particularly relevant for a restrictor analysis of *if*, which removes any meaning from *if* other than as a restrictor to another operator.

<sup>4</sup>A name which seems to have won out over potentially more accurate competitors (e.g. *de-subordination*) due to catchiness more than anything.

<sup>5</sup>The insubordination literature at times makes diversions to justify co-construction cases as non-insubordinate. Given the general interactive approach here, this can be assumed.



One final note on the term insubordination: much like ‘biscuit’ and ‘Austin’ conditional are useful conventional terms, here we will stick with ‘insubordinate *if*-clause’, rather than possibly more descriptive competing terms of ‘isolate *if*-clauses’, ‘free conditional clauses’, among others. The term is not as analysis-neutral as *biscuit*, but in the broad definition of insubordination by Kaltenböck (2019) that will be introduced below, it should suffice.

Below, we will take an overview of the work on insubordinate conditional clauses and insubordinate English *if*-clauses in particular. Following that, we will see how these functions can be related to either a pragmatic association with a topos, or the semantic function of *if*-clauses applied at a higher discourse level, and so treat them consistently with the semantics of hypothetical conditionals.

Three notions should be briefly introduced: (i) insubordination through ellipsis, (ii) functional extension, and (iii) classification of insubordination into stand-alone and elaborative cases. Although the description of both processes of insubordination are diachronic, the points in the process are useful to keep in mind.

Insubordination through ellipsis, due to Evans (2007), postulates a four step process from full subordination (i.e. a biclausal construction with a subordinate clause), to ellipsis of the main clause (where material can be recovered), to conventionalisation of the ellipsis (with interpretation of ellipsed material still possible but restricted), to full insubordination.

An alternative path to seemingly matrix-less ‘subordinate’ clauses was proposed by Mithun (2008) on the basis of data from a number of North American languages from different families (and in particular their use of syntactic dependency markers to signal narrative dependency). Extension is a process whereby patterns of grammatical dependency ‘extend’ in function from the sentence to more general discourse and pragmatic domains.

Kaltenböck (2019) provides a more precise way to delineate insubordination than the original notion of some ‘main clause use’, suggesting a broad classification based on two parameters: syntactic and pragmatic independence. Where subordinate clauses are syntactically and pragmatically dependent on other material, insubordinate clauses are syntactically independent, and can be further divided into elaborative insubordination, with pragmatic dependency on other material, and stand-alone insubordination, which is also pragmatically independent. Pragmatic independence is harder to identify than syntactic independence, but the intent can be illustrated by lone directive or optative *if*-clauses, which are self-contained and stand-alone, versus *if*-clauses commenting on another utterance.

Non-hypothetical conditionals, such as biscuit conditionals and metadiscursive conditionals, are explicitly placed in the realm of elaborative insubordination. Within the tradition of encoding illocutionary force on a syntactic level, mentioned before, different types of conditionals have been attributed to different levels of attachment between the antecedent and consequent. However, an alternative syntactic theory posits syntactic independence between the two, and only a discourse association between the *if*-clause and the target consequent clause. It has been proposed (Frey, 2016) that these two analyses are not truly in conflict, but are complimentary, with each applicable in different cases. Metalinguistic conditionals in this scenario are syntactically independent, but associated with the speech act of the consequent clauses.

Metalinguistic *if*-clauses can be used on low-level items which are only constituents, and cannot really be said to have an associated illocutionary force of their own, being only short segments within the larger assertion, question, etc. Pragmatic dependence

on the speech act specifically is too narrow an understanding, but these lines of investigation appear simpatico, and to have converged more or less upon a similar conclusion.

### Insubordinate conditional clauses

Consequentless *if*-clauses have been recognised since before their inclusion in the emerging study of insubordination.

Quirk et al. (1985) include isolate optative *if*-clauses (e.g. *if only I had been there!*) as ‘irregular sentences’ expressing an exclamative wish. The use of conditionals to issue polite directives was recognised by Ford and Thompson (1986), and in a follow-up paper focusing on spoken language data, Ford (1997) observes that this function can be performed by the *if*-clause alone, and that speakers “do not treat [an *if*-clause] as grammatically or pragmatically incomplete” (p. 405) in that context. Huddleston and Pullum (2002) identify “conditional fragments” as a “minor clause type”, explicitly including *if*-clause optatives, *if*-clause directives, and *if*-clause exclamations (*Well, if it isn't the man himself!* etc.). In the first focussed work on insubordinate *if*-clauses in English, Stirling (1999) examines isolate *if*-clauses, as she calls them, primarily in Australian English corpora – a combination of text, court hearings, and doctor-patient interactions – and in the Scottish HCRC Map Task Corpus. She largely focuses on the *if*-clause directive (though also identifying *if*-clause optatives), noting that the use of forms other than a standard imperative clause to give directives is a common device. She argues that these isolate *if*-clauses be identified as an emerging minor sentence type, rather than treated as mere fragments of conditionals.

Evans (2007) argued on the basis of cross-linguistic evidence that the use of ‘subordinate’ clauses without any matrix clause is a wide-spread and often conventionalised behaviour. Evans identifies *if*-clauses as part of this, pointing to their use to express requests, wishes, offers and threats. Following this (and a subsequent paper by Mithun, 2008), the establishment of ‘insubordination’ as an area requiring attention has led to more work on insubordinate conditional clauses in the vein of Stirling’s work on isolate *if*-clauses in Australian English. Insubordinate conditional clauses have since been investigated across a number of languages for their functions, the degree of conventionalisation of these functions, and the likely routes to their insubordination.

In Italian, Lombardi Vallauri (2004; 2010; 2016) identifies a set of functions performed by insubordinated *se*-clauses<sup>6</sup>, and considers them be mostly available for ‘completion’ via a consequent clause. However, given the restrictions on the possible completions for a given function (e.g. ‘completion’ of offers only with a positive result or explicit invitation), these insubordinated *se*-clauses and their functions at least can be considered at least partly conventionalised.

Schwenter (2016; 1996) identifies an *adversative* function of Spanish insubordinated *si*-clauses as particularly conventionalised. *Adversative si*-clauses not only have the effect of introducing their content as true, but do so in an adversative fashion, and imply that their content, which contradicts or makes irrelevant the previous speaker’s utterance, is information the previous speaker should have known already.

In cross-linguistic comparison, D’Hertefelt (2015) investigates insubordinated complement and conditional clauses in six Germanic languages (English, German, Swedish,

<sup>6</sup>given as *Invitation/Offer/Request*; ‘*What will happen?*’; ‘*There is nothing to do*’ (for better or worse); *Protest*

Dutch, Danish and Icelandic). Of her six categories of insubordinated Germanic conditional clauses, one is a request or invitation for completion, using elliptical prosody to invite the addressee to provide a consequent (whether out loud or internally), while another is analysed as non-insubordinate, taking its consequent from a specific other utterance. The four remaining broad categories are described in terms of function as deontic, evaluative, assertive, and argumentative. They also vary in their compatibility with a consequent, which she argues is evidence of a plurality of isolate *if*-clause constructions with varying levels of conventionalisation, rather than a single multi-functional one.

Another point in favour of recognising the role of conventionalisation is the varying levels of attestation across languages. English *if* appears to be one of the most flexible, second only to Dutch in the data surveyed in terms of coverage of D'Hertefeldt's functional categories.<sup>7</sup>

For English only three of the fine-grained subcategories are unattested: the *negative threat*, *addressee-oriented suggestion*, and *lower-limit evaluative*. For the negative threat, where the action the addressee is being threatened into doing is in the negative, an example can be found below, where a parent reprimands a child:<sup>8</sup>

- (111) *Parent*: If you don't stand properly Matt!  
*Child*: I am! (KD7 2070–1)

In addressee-oriented suggestion, the conditional clause suggests an action which may benefit the addressee. Natural in Dutch (ex. (79) reproduced here as (112)), it is unintuitive with a bare *if*-clause in English: but it is worth mentioning that it can be done via *What if...?*

- (112) *A*: Hey!  
 'Hi!  
*We moeten een affiche naar de drukker sturen, maar nu blijkt dat de resolutie van onze afbeelding te klein is. Iemand een idee hoe ge die kunt vergroten zonder kwaliteit te verliezen?*  
 We have to send a poster to the printer, but now it turns out that the resolution of our image is too low. Does anyone know who we can fix this without quality loss?'  
*B*: *Als je dat nu eens aan diene drukker zelf vraagt?*  
 COND you DEM PRT PRT to that printer himself ask.PRS  
 '(What) if you ask the printer himself?  
*Wedden dat die dat op 5 min heeft gefikst?*  
 I bet he'll have it fixed in 5 minutes.'

<sup>7</sup>There may some effect of data sparsity at play. Although native speaker elicitation was used to supplement the Swedish and Danish data (and comprised all of the spoken Icelandic data, for which there was no speech corpus), the corpora used are quite different in size, from the spoken portion of the Collins Wordbanks Online corpus for English (61.5 million tokens) to the BySoc-corpus for Danish (1.3 million tokens). It is notable that the languages with the best coverage are the three with larger corpora – Dutch, English and German. Despite elicitation, the informality of these uses may have hampered the speakers' perceptions of whether they were acceptable. This does not undermine the more general point about language-specific levels of conventionalisation (especially as the distribution of insubordinate complement clause functions based on the same data do not show this pattern as strongly), but is a reason to be cautious about assuming these are hard limitations.

<sup>8</sup>Names are replaced by roles here for clarity: father and son are *both* named Matthew, with the father attributed as 'Matt', and the son (addressed here as 'Matt') attributed as 'Matthew'.

([http://www.noxa.net/topic/786151738/\\_Resolutie\\_verhogen/-Resolutie-verhogen-,22/10/2014](http://www.noxa.net/topic/786151738/_Resolutie_verhogen/-Resolutie-verhogen-,22/10/2014))

Lastly, the lower-limit evaluative (in which the conditional clause case is the best option from some set, but still negative) was not found attested, but seems intuitive. An example for German is her example (5) (originally Pasch et al., 2003) as follows:

- (113) *Da kommt Peter.*  
 ‘There comes Peter.  
**Wenn ich den schon SEhe.**  
 COND I him PRT see.PRS.IND  
 Ugh, **just seeing him makes me sick** [lit.: If I just sEE him.]

However, a near-literal translation in English of “If I even just see him” seems to capture the same repulsed meaning as the gloss and original, if produced in a similar context with negative affect.

Barring the addressee-only suggestion then, all of these functions appear to be available for English *if*-clauses, albeit sparse to the point of not appearing in the original data. The others are not necessarily unavailable as interpretation in principle, but are not frequent enough for the rarer interpretation to be predictable without further cues from a consequent, and so incapable of being used to perform the associated moves alone.

Returning to English, Kaltenböck (2016) also argues that directive insubordinate *if*-clauses should be recognised as a conventionalised construction. In addition to noting their frequent final prosody and the difficulty for speakers in ‘completing’ a potentially ellided consequent clause, he observes a minimal formal overlap between directive *if*-clauses and conditional *if*-clauses. That is, *if*-clauses used as directives typically have a particular form,<sup>9</sup> which is relatively rare in *if*-clauses used to form complete conditionals. If this form of antecedent is relatively uncommon outside of a directive, intent should be especially predictable from the *if*-clause alone, and for any ‘completion’ to be superfluous. He also argues that given their “minimal formal and functional overlap”, directive *if*-clauses and *if*-clauses for conditionals should be considered isomorphic. Assertive *if*-conditionals may still include directives via their antecedent, as mentioned elsewhere and illustrated in (114), which simultaneously instructs the addressee to phone at a certain time, and informs them what will be possible in that scenario.

- (114) *Anon 1:* ⟨laugh⟩ And ⟨pause⟩ right, er if you give me a phone about ⟨pause⟩ twelve on Thursday morning,  
*Unknown:* Mhm.  
*Anon 1:* we should have that result back, be able to tell you what’s happening.  
 Okay?  
*Unknown:* Mhm. (GB4 156–60)<sup>10</sup>

Although directive *if*-clauses are mostly insubordinated, they do not need to be totally stand-alone. Recognising lone directive *if*-clauses as a conventionalised stand-alone construction (albeit descended from conditional *if*-clauses) should still leave room for the same function (a directive to carry out the *if*-clause action) being effected by *if*-clauses which are not entirely stand-alone.

<sup>9</sup>i.e. second person subject in present tense with a modal, among a other features

<sup>10</sup>Speaker attribution in original transcript is faulty, attributing all utterances to *Anon 1*.

### 5.2.4 Utterance repair: another case of metalinguistic management

One additional connection to make is between LHs and utterance repair, and self-repair in particular. Self-repair includes examples like the following:

- (115) until you're at the le- I mean at the right-hand edge (from Ginzburg, Fernández, and Schlangen, 2014)
- (116) Our dog likes- he loves the beach. (from Shriberg, 1994)

Self-repair can be generally analysed as follows: an utterance is begun, but at some point includes a reparandum, an element that will need to be repaired. The speaker interrupts their own utterance, possibly including an editing term (*I mean*), and provides a replacement or reformulation for the faulty segment. The speaker can then continue their utterance with the repair completed.

Looking at LHs as a metalinguistic phenomenon, they likewise involve managing a sub-clausal segment which may (at least potentially) be faulty.

For our understanding of repair itself we directly follow the analysis of Ginzburg, Fernández, and Schlangen (2014), who connect it to the phenomenon of clarification requests, as in (117):

- (117) A: I saw Michael earlier.  
 B: Tall Michael?  
 (*Did the speaker mean the person identifiable as 'Tall Michael' by "Michael"?*)

Following an utterance, a range of potential questions related to (and definable on the basis of) that utterance become available, and can be raised by making a clarification request. In (117), *B* is uncertain about whether they have successfully identified the referent of *Michael*: the clarification request allows them to verify that the individual referenced is the same individual who can be identified as *Tall Michael*. If *A* turns out to have meant a different individual, *B* can update their understanding of the question, and answer relative to the newly clarified referent instead.

Self-repair is a similar process, but rather than resolving uncertain or incomplete assignment of a contextual parameter, a speaker modifies their utterance to better match an intended meaning or linguistic standard. Just as issues related to clarification become available following an utterance, so do issues related to repair become incrementally available word by word (or with an even higher latency). These can be accommodated as a live issue when a speaker makes a repair, the repair being interpreted as resolving the issue, rather than as a baseless interjection. In (118), "Martin" resolves an accommodated issue of what the speaker had intended by the utterance "Michael".

- (118) A: I saw Michael – *Martin* earlier.  
 (Question: *What did I mean when I said "Michael"?*  
 Answer: "*Martin*")

The original understanding of the utterance can then be modified to incorporate the correction, just as with the potential modification following the answer to a clarification request. Speaker *A*'s utterance should be interpreted as an assertion that they saw *Martin* earlier.

A little more formally, following Ginzburg, Fernández, and Schlangen (2014), this can be characterised as follows, with *A*'s representation of the dialogue state updating from (119a) to (119b) to (119c):

- (119) a. 
$$\left[ \begin{array}{l} \text{spkr} = A \\ \text{Pending} = \left\langle \left[ \begin{array}{l} \text{sit} = u0 \\ \text{sit-type} = T_{I \text{ saw } Michael} \end{array} \right] \right\rangle \\ \text{QUD} = \langle \rangle \end{array} \right]$$
- b. 
$$\left[ \begin{array}{l} \text{spkr} = A \\ \text{Pending} = \left\langle \left[ \begin{array}{l} \text{sit} = u0 \\ \text{sit-type} = T_{I \text{ saw } Michael} \end{array} \right] \right\rangle \\ \text{MaxQUD} = [q = \lambda x \text{Mean}(A, u_{Michael}, x)] \\ \text{LatestMove} = \langle \text{Assert}(A, \text{Mean}(A, u_{Michael}, Martin)) \rangle \end{array} \right]$$
- c. 
$$\left[ \begin{array}{l} \text{spkr} = A \\ \text{Pending} = \left\langle \left[ \begin{array}{l} \text{sit} = v0 \\ \text{sit-type} = T_{I \text{ saw } Martin} \end{array} \right] \right\rangle \\ \text{QUD} = \langle \rangle \\ \text{LatestMove} = \langle \text{Assert}(A, \text{Mean}(A, u_{Michael}, Martin)) \rangle \end{array} \right]$$

In (119a) the currently pending utterance in progress is  $u0$ , so far classified as being of the type *I saw Michael*. They then self-correct with an disfluent utterance of *Martin* in 9119b). This is coherent when interpreted as addressing an issue of what they meant in their previous utterance. This question is accommodated as the maximal question under discussion, licensing the disfluency in the same way as a short answer. Having interpreted *Martin* as an assertion of what *Michael* had been intended to be, the pending utterance is updated in (119c). Rather than the original  $u0$ , it should be treated as utterance  $v0$  replacing the reparandum *Michael* with the repair material *Martin*: when the utterance is complete, the utterance that should be grounded will be an assertion of *I saw Martin earlier*.

### Editing phrases and LH *if*-clauses

In LHs the *if*-case provides a situation where there is no issue about correctness or acceptability:

- (120) we ‘advertised’ it **if that’s the right term** to the people at large that we were looking to acquire businesses (*ICE-GB S1B-065 078*)
- (121) it is still peanuts **if you’ll pardon the expression Jimmy** compared with the previous incumbent (*ICE-GB S2B-021 017*)

The target terms in the above examples are only correct or appropriate in the cases where they are, in fact, correct or appropriate. It has been generally observed that a conditional introduces the implication that its antecedent case is uncertain, and may or may not be the case (Gazdar, 1979): having not previously established that the flagged items are correct and appropriate, the LHs introduce that this cannot be assumed.

In both repair and LHs, a speaker identifies and respectively either corrects a fault or flags a potential fault in part of an utterance. Editing phrases such as *I mean* in (115) are an optional element to repair,<sup>11</sup> and LH *if*-clauses can be seen as something similar,

<sup>11</sup>only 15.77% of repairs included an editing signal in Hough’s (2015) study on repair in the Switchboard corpus.

signalling if not the need for a repair, then the potential need for one. Like editing phrases, and unlike true adnominal *if*-clauses, they are not to be parsed as part of the content the speaker aims to express with the utterance, but treated as a metalinguistic device. Some editing phrases indicate that a repair is needed and forthcoming (e.g. *no* in *le- no, right*, with *no* indicating the self-interruption will be followed by self-repair rather than a repetition), while others provide a more explicit cue for why the repair is happening (e.g. *I mean*), raising an associated issue (*what did the speaker mean?*). Similarly, *if*-clauses can flag a potential repair site for very general (e.g. *if you like*) or more specific (e.g. *if that's the right term*) reasons.

We saw a backward-looking editing phrase in (116), but disfluencies may be also forward-looking, as in (122), where the filled pause precedes the difficult item, or the filled pause and explicit metalinguistic comment before *cerebral* in (123)

(122) Show flights arriving in **uh** Boston (from Shriberg, 1994)

(123) you're being a bit more **erm what's the word** cerebral aren't you (BNC JYM 369)

We noted above that LH *if*-clauses are usually post-posed to the flagged segment, but a minority are pre-posed:

(124) the defendants certainly **if I may descend to the homely** 'put their running shoes on' at any stage in the proceeding (ICE-GB S2A-063 057)

There is not much to say here with respect to forward-looking disfluencies specifically. However, we should note how lexical hedge *if*-clauses may be used both to raise a potential problem with a previous segment, and to pre-emptively signal one for an on-coming item – in contrast to adnominal *if*-clauses, which must be post-posed. In this respect, LHs resemble disfluent metalinguistic comments more than adnominal conditionals.

In backward-looking disfluency, repair material is integrated in place of the reparandum, creating a divergence between the content provided by the original utterance and what is treated as the content for the speech act. For example, (116) should eventually be handled as an assertion of the proposition that *our dog loves the beach*.<sup>12</sup> Repairing an utterance allows faulty material to be replaced/ altered. The editing phrase is likewise ephemeral in a sense: it is part of the repair operation and the history of the exchange, but is not itself part of the repaired representation of the utterance: the speaker of (116) is asserting that *our dog loves the beach*, not *our dog I mean loves the beach*.

A lexical hedge *if*-clause can be seen as a similar metalinguistic intervention, to be dismissed from the utterance once its function has been performed – that being the (likely trivial) acceptance that the *if*-case is so, and that the potential reparandum can be left as is.

We can draw a direct parallel between a reparandum and an editing phrase, and a possible reparandum and an LH *if*-clause. Furthermore, we can pair this with Csipak's notion of the *if*-clause applying to a presupposition associated with the 'consequent', rather than its at-issue content.

<sup>12</sup>This is not to say that the reparandum and editing phrase are treated as if they never existed and excised from conversational history: this is clearly not the case given that, for example, the reparandum may provide an antecedent for something in the repair material (*our dog/he* above).

### 5.3 Dealing with LH *if*-clauses

In this section, we will focus specifically on metalinguistic *if*-clauses used to manage sub-clausal segments. These present a challenge for analyses of metalinguistic conditionals as semantically identical to hypothetical conditionals, with only a change in felicity resolution, since these cases involve consequent items with content below the level of the proposition.

In section 5.3.1 we will compare LHs to both full-clause metalinguistic conditionals and adnominal conditionals, and conclude that they cannot be trivially incorporated into an analysis of either (or at least, not so long as full-clause metalinguistic conditionals are expected to function truth-conditionally as typical conditionals). However, they are still the most closely related phenomena to LHs. Using these analyses as a starting point, in section 5.3.2 I will provide an analysis for LH *if*-clauses, and its implications.

#### 5.3.1 Comparison with similar *if*-clause phenomena

The two most similar phenomena to LHs are, as mentioned, metalinguistic conditionals and adnominal conditionals. If we were to identify an adequate treatment of either of these, could LHs then be reduced to one or the other?

##### LHs aren't 'full' metalinguistic conditionals

The examples in this section are from a combination of two sources: the data taken from the BNC as previously reported corpus study, and the released corpus study data from Elder (2015). Those identified thanks to the corpus study by Elder (2015) were found by reviewing the subset of *if*-clauses classified as *Illocutionary Force Hedges*, where they were included among that class. Those identified among the BNC had been flagged as lacking a clausal consequent, but being still associated with another utterance segment: these were then reviewed to identify those acting as lexical hedges.

First, moving these *if*-clauses to the clause boundary changes their interpretation. Contrast (125a) and the modified (125b):

- (125)
- a. I'm sure you could all add to that list of kind of 'symptoms' **if you like** of waste and inefficiency in organised society (*ICE-GB S2A-049 016*)
  - b. **if you like** I'm sure you could all add to that list of kind of 'symptoms' of waste and inefficiency in organised society
  - c. I'm sure **if you like** you could all add to that list of kind of 'symptoms' of waste and inefficiency in organised society
  - d. I'm sure you could all add to that list of kind of 'symptoms' of waste and inefficiency in organised society **if you like**

Once the *if*-clause is properly pre-posed or post-posed to the clause, it is reinterpreted as hedging the entire clause, not just 'symptoms'.

Among the 41 LH instances identified from the sources above, all but four have the *if*-clause directly adjacent to the target word or phrase. The other four are still



adjacent to the sub-unit containing the item.<sup>13</sup> Given the preference for placing the *if*-clause adjacent to the target segment, and that its function relates only to that segment, analysing the whole clause as consequent seems neither advantageous nor natural. Quite the opposite: doing so requires creating a distinction between the ‘real’ consequent and the part of the utterance the *if*-clause is interpreted as related to.

Having noted that the interpretation of lexical hedges is generally disrupted when the *if*-clause is separated from the target segment, consider the example (126a) and the altered (126b):

- (126) a. Is, is the a (pause) a danger Geoffrey Hoskin that the instability in the Soviet Union, if one can still call it, a Union, could affect us, could spill out across its borders? (KJS 23)
- b. If one can still call it a Union, is there a danger that the instability in the Soviet Union could affect us, could spill out across its borders?
- c. Is there a danger that the instability in the Soviet Union could affect us, could spill out across its borders, if one can still call it a Union?

In (126b) the potential issue with the *Union* part of *Soviet Union* is still identifiable thanks to its explicit mention in the *if*-clause. When the problem segment can be identified, issues with a specific segment can be raised at a distance. In such a pre-posed (or post-posed) case, it is more reasonable to interpret the *if*-clause as associated with the whole utterance, akin to (102). The alternative is to associate the *if*-clause only with the flagged segment, despite the possibility for whole-utterance hedges, and the fact that the *Union* segment is separated from the *if*-clause by a significant amount of intervening material. The overall effect is essentially the same, as a fault in one component of the utterance is a fault in the utterance as a whole.

However, this should not be a reason to over-generalise and so re-simplify the adjacent LHs as therefore ‘really’ being conditions on the entire surrounding clause. Forcing this mid-utterance intervention into an interpretation as a condition over the entire utterance, on the grounds that full utterances are hedged in other cases, would be attempting to find their shared features in the wrong place. We can do better by recognising that *if*-clauses can be used to perform the same function at different levels of granularity.

Lexical hedges can also be contrasted with genuinely elliptical consequents.

- (127) climate is just a little ‘*transient part*’ **if you like** in this process (ICE-GB S2A-043 044)
- (128) and then cut some bacon up, put that in saucepan just let it brown a bit [...] in a bit of fat, er soften onions, then put mince in, brown mince [...] erm *a bit of garlic* **if you like garlic** (KB2 359–363)

Where the consequent is sub-clausal, like in (127), its role in context may not be as a proposition at all. In (128) on the other hand, *a bit of garlic* essentially functions as an imperative, on the basis of the previous instruction to “put mince in”, and given the context *a bit of garlic* could be expanded in interpretation to something like *put a bit of garlic in*. Unlike (128), for the first example to be elliptical, we would need to

<sup>13</sup>These are: (i) “those if you like *slightly more* ‘conservative stolid audiences’” (ICE-GB S1B-050 092); (ii) “a particular ‘image’ of them if you like” (ICE-GB S2A-057 072); (iii) “we ‘advertised’ it, if that’s the right term, to the people who [...]” (ICE-GB S1B-065 078); and (iv) “Very sweet *chappy* [...] If you can say a man’s sweet” (BNC KB3 1556).

pose the existence of an implicit clause that has no evidence anywhere elsewhere in the utterance. Either we treat the entire clause as the consequent, insist on a ‘covert’ conditional, or we accept that *transient part* functions as a consequent item in its own right. An analysis should not require examples like *transient part* (127) to be anything other than what they already are in situ.

### LH *if*-clauses aren’t adnominal *if*-clauses

At a glance, LHs and adnominal *if*-clauses appear similar. However, LHs exhibit some traits which violate the limits of true adnominal *if*-clauses.

Firstly, adnominal *if*-clauses are quite limited in what they apply to. Even among nominal targets, they cannot modify proper names, as in the following contrast from Lasersohn (1996, 4b, 4a):

- (129) a. John, if you bother him long enough, will give you five dollars.  
 b. \* John if you bother him long enough will give you five dollars.

With parenthetical intonation in (129a), the *if*-clause can be interpreted as an interposed antecedent to the entire main clause. Meanwhile (129b), without treating the *if*-clause as an aside, does not lend itself to reinterpretation with “John if you bother him long enough” as subject, and sounds odd. This isn’t shocking: as Lasersohn points out, the proper name “John” is expected to designate the same referent whether “you bother him long enough” or not. By contrast, the overtly metalinguistic lexical hedges can be applied to proper names without issue as in the following example:

- (130) Within the last twenty years the People’s Republic of China became so fearful of the population outstripping the means of subsistence within her frontiers that **‘Peking’ if I can still call it like that** decreed restraint of parenthood under penalty to one child for each couple (ICE-GB S2B-048 071)

They can also target segments which are not nominal at all:

- (131) He **‘perverts’ if you like** sort of high art quite often (ICE-GB S2A-057 135)  
 (132) The normal ink of the Pharaonic period was carbon black, **‘lamp black or soot’ if you like** (ICE-GB S2A-048 089)  
 (133) More and more people are being **if you like ‘forced’** into the private sector (ICE-GB S1B-039 102)

Adnominal *if*-clauses must be positioned directly after the rest of the NP material:

- (134) \* **If it rains the location** and **if it doesn’t rain the location** are within five miles of each other.

LHs on the other hand, although usually post-posed, can be unremarkably pre-posed, inter-posed between content words in the phrase they affect, or even, in the case of determiner phrases, positioned between the determiner and the rest of the nominal material.

- (135) Well it isn’t accountable on the basis that it merely is a group of Chief Constables who sit down together to consider the new issues and and devise **if you like ‘systems of policing’** (ICE-GB S1B-033 079)  
 (136) So I mean like entries in a **‘dictionary’, if you like, ‘definition’** (ICE-GB S1B-076 083)

- (137) we've got to get those **if you like** slightly more '**conservative stolid audiences**'  
(ICE-GB S1B-050 092)

Despite the surface similarities then, it does not seem that direct equivalence to adnominal conditionals is right.

As an additional note, it is striking that a majority (30 out of 41) of the LHs identified were transcribed with scare quotation. In an experimental study in German, Kasimir (2008) recorded participants reading sentences with or without quotation marks on some sub-clausal segment. The audio with the clearest perceptible presence of quotation was then identified through a second task, with participants matching the audio to transcriptions either with or without quotation marks on the sub-clausal segment. The recordings with the highest rates of quotation identification (at least 11 out of 12) were re-used as material for a transcription task: despite having pre-selected for material with the strongest indications of quotation, quotation marks were not reproduced in a majority of transcriptions. In fact, no tendency was observed whatsoever: 3 out of 18 quoted versions *and* 3 out of 18 non-quoted versions being transcribed with quotation marks.<sup>14</sup>

We do not want to over-exaggerate the significance of this study, which is very limited: the selection of audio for the re-transcription task was exclusively based on the identification success rate, with no acoustic analysis to verify whether this correlated with more distinct prosodic marking, and there were very few participants in the re-transcription task, making it unwise to generalise too much. Neither do we want to take too seriously the orthographic habits of individual transcribers of oral corpora, nor downplay potential cross-linguistic differences – perhaps an English-language replication of these tasks would produce a rate of orthographic scare quotation closer to the rate at which it was recognised in the audio material. However, the strong trend towards marking scare quotation as present in these LH cases, far above the rate of 'successful' quotation re-transcription in Kasimir's study, is a potential indication that this use is understood as metalinguistic in a way that true adnominal conditionals are not.

### 5.3.2 Lexical Hedge *if*-clauses

Csipak (2017) analysed adnominal *if*-clauses as being attached to not-at-issue presuppositional content which was triggered by the description, with the description's truth-conditional content unaffected. The principle can be extended to LHs: instead of a presupposition triggered specifically by a description, these metalinguistic uses apply to assumptions about the target utterance segment – namely, that it is groundable and acceptable. We already include these kinds of beliefs in modelling repair: through functional extension from truth-conditional content to higher discourse elements, they can be managed via *if*-clause.

Metalinguistic comments can introduce what would normally be assumptions into the common ground. Recall the example of self-repair in (115) earlier. In repairing the partial utterance of *left*, the speaker resolves the divergence between their intended meaning and the originally-expressed meaning. In addition to repair, metalinguistic commentary can manage situations where a speaker is unsure about their lexical

<sup>14</sup>5 out of 6 were sentences containing a title. The other was a potential mixed quotation – the recording given quotation marks in this transcription, incidentally, was one where the original text did *not* indicate the section was quoted.

choice, whether because it may not match their intended meaning, or because it violates expectations for the interaction:

- (138) Is it psycho psychosomatic **is that the word?** (BNC KDJ 766)  
 (139) if it were just a member of the public I think we could we could **being crude** I think we could fob 'em off (BNC K6W 723)

Self-repair actions provide answers to questions which become available following an utterance – or sub-utterance. When the repair takes place, it can be interpreted by relating it to an accommodated issue with the utterance. Without the metalinguistic action, there is no need to raise or address these potential problems, which can be assumed not to have arisen.

Interlocutors can usually assume that an utterance is as intended: the speaker intended to use a word with a lexical profile that matches the phonology/orthography they produced, and chose a word whose meaning matches the meaning they want to express. Interlocutors can also generally expect that a speaker will follow the conventions and standards expected for the interaction (matching vocabulary and topic to the register of a formal interview, a casual conversation, etc.). The metadiscursive behaviours previously mentioned help to manage scenarios where this has not (or potentially has not) happened. Making recourse to these assumptions, and the extent to which they apply at any given point, in the case of metalinguistic *if*-clauses is motivated by other metalinguistic behaviours which (implicitly or explicitly) also require their presence.

The notion of groundability I will use is loosely based on Visser et al. (2014), an incrementation-friendly expansion of Traum (1994): an utterance by speaker *A* is not entered into the common ground until *B* understands it relative to current purposes. Where *B* cannot come to this understanding – due to an unidentifiable referent, unknown word, etc. – they can request clarification. Once the utterance fulfils this criterion (whether through the initial understanding or further clarification), it is groundable. Per our current framework an utterance can be considered groundable when “all contextual parameters can be instantiated in a way consistent with the speaker” (Ginzburg, 2012).

In example (120), repeated here, the speaker explicitly flags that *advertised* may not be the term for the action they are trying to describe.

- (120) we ‘advertised’ it if that’s the right term to the people at large that we were looking to acquire businesses (S1B-065 078 ICE-GB)

Grounding and repair are touchstones for the analysis of lexical hedging *if*-clauses here, but not all issues are problems in comprehension or parsing. In (121), likewise repeated here, the speaker flags a potential tone violation:

- (121) it is still peanuts if you’ll pardon the expression Jimmy compared with the previous incumbent (ICE-GB S2B-021 017)

With its request for pardon, this example suggests that to justify certain *if*-clause uses there must be some representation of politeness in the context, e.g. via a notion of rapport (see Tickle-Degnen and Rosenthal, 1990; Spencer-Oatey, 2005). We will keep the comprehension notion of groundability, which means that politeness negotiations are after the fact. Given the tone cases like (121), this creates two interpretations of LHs. However, the alternative is to either (a) treat all cases as a comprehension-based grounding issue, including when speakers explicitly mention tone, or (b) treat all cases

as an acceptance issue, including when speakers explicitly raise the question of lexical accuracy (e.g. (120), which appears to deal with a similar problem as the direct request of (138)).

As a result, we see LHs used to handle two metalinguistic aspects: informational correctness and conversational tone. At least some LHs can be viewed as highlighting an offered conceptualisation for the speaker's intended meaning, and the recognition that this may require formation of a temporary lexical pact. There is no clear line between the informational and tonal uses, and a given case may be ambiguous, e.g. the uncertain aspect of the conceptual pact may be in allowing a tonally dissonant term into the conversation, or in accepting a term which does not entirely match the intended meaning. In either case, all will ultimately require some kind of repair or compensation if the original has gone awry.

### Informational Grounding

For illustrative purposes, the first case will be a constructed case with a potential mispronunciation. The addressee can normally assume that their classification of the utterance event is correct, and provides the content intended by the speaker. The LH *if*-clause makes explicit a condition on which this depends, introducing this dependence to the common ground along with the implication that the *if*-case is not certain – as would be otherwise assumed. This allows LHs to be used for a variety of effects, such as saving face by showing the speaker is aware of the error or possible error, or alerting an addressee that repair may be needed. For a parallel with the repair examples (119a)-(119c), there is no need to doubt whether the speaker meant *Michael* by the utterance  $u_{\text{Michael}}$ , i.e. whether  $\text{Mean}(A, u_{\text{Michael}}, \text{Michael})$ , until they repair it. The potential failure and its management are the exception rather than the rule.

Groundability can be evaluated via successful classification of the utterance: concretely, that the locutionary proposition is true, with the utterance token being fully classified by a constructed utterance type. We add an additional constraint on groundability that the utterance expresses the speaker's intended meaning. As per the repair process, we want to recognise that a mistakenly used word should not be grounded, even if it is itself perfectly understandable (e.g. once the interruption and repair take place in "Go left – uh, I mean *right* at the traffic lights", the content of the original *left* sub-utterance is not part of the grounded assertion, despite being understood).

$$(140) \quad \text{For speaker } spkr \text{ and locutionary proposition } p_u = \left[ \begin{array}{l} \text{sit} = u \\ \text{sit-type} = T_u \end{array} \right]$$

$\text{groundable}(p_u) = \text{Classify}(T_u, u) \wedge \text{Mean}(spkr, u, u.\text{cont})$ .

$p_u$  is groundable where the speech event can be successfully parsed and its contextual parameters instantiated, and its content is the content intended by the speaker.

The application of *if* will be glossed as a two-place predicate  $if(\alpha, \beta)$ , with  $\alpha$  as the proposition forming the *if*-clause, and  $\beta$  as the element it affects. Note that for filling this in with an analysis of *if* as a modal restrictor, a further step is required to determine what the operator on the consequent should be.

Through the *if*-clause, these lexical hedges make explicit a necessary condition for the target segment's groundability or acceptability, mentioning issues of accuracy or addressee acceptance. These are conditions which need to be fulfilled regardless: like the correction of term-meaning mismatch in repair, the metalinguistic comment

merely makes the assumptions explicit, rather than creating them. *If*-conditionals can be used to justify the consequent by directly connecting it to an antecedent that has been established as true, without casting doubt on that antecedent. Recall the general observation that a conditional with an unconfirmed antecedent implies uncertainty of that antecedent:

- (141) *Observation:* For proposition  $p$  which is not established as true, introduction of conditional *if*  $p$ ,  $q$  implies non-certainty of  $p$ .

The truth of the *if*-cases in the LHs, unlike the justification conditionals mentioned, have not been established for the target segments. In introducing the *if*-case without establishing it, the speaker indicates that it is not certain.

In the following constructed example,  $A$  is uncertain about their choice/production of *thermonim*:

- (142)  $A$ : They had a... *thermonim*, if that's how you say it.  
 $B$ : A *theremin*.  
 $B'$ : Yeah, I know what you mean.

This could be a pronunciation issue or a lexical choice problem, a question of whether *thermonim* matches any vocabulary item at all. Either way, it comes down to whether or not the locutionary proposition is true i.e. the utterance is correctly classified. This is so whether the problem with the use of *thermonim* is that it is considered a distinct item that mismatches the intended utterance content, or that it is identified as a faulty pronunciation of lexical item *theremin*.

On recognising the metalinguistic use of the *if*-clause (here containing explicit reference to how a word is said/concept is expressed) it can be interpreted relative to a property of the utterance, rather than its semantic content. The repair earlier was licensed by an issue with the utterance meaning, the issue accommodated to resolve the repair disfluency: the assumption about the target utterance's groundability is likewise made available by a metalinguistic comment.

- (143) *if*(that's-how-you-say-it<sub>PROP</sub>, groundable(*thermonim*<sub>LOCPROP</sub>))

In contrast to some accounts of metalinguistic conditionals mentioned earlier, this is not a condition on the existence of the utterance, or on the assertion the completed utterance is being used to make. Instead, it is an additional comment on the correctness of its classification: *thermonim*<sub>LOCPROP</sub> still enters *Pending* as a constituent of  $A$ 's utterance, which awaits grounding. The resulting 'conditional' in (143) is not-at-issue material, but the *if*-case has now been introduced as an uncertainty.

$B$ 's successful follow-up in both responses assumes that  $B$  can identify the word  $A$  was trying to say, or at least the intended concept even if they are also unsure of the word: we are glossing over just *how*  $B$  recognises what  $A$  tries but fails to produce. We make the assumption this is possible based on various factors e.g. it has been established that  $A$  is talking about musical instruments,  $B$  knows the word *theremin* in that domain,  $B$  can recognise *thermonim* as having a similar phonological profile to *theremin*.

Since the flagged word is at the end of the clause in this example, and the *if*-clause is clause-final, this could also be interpreted as a condition on the groundability of the entire utterance rather than the sub-utterance containing the questioned word.

- (144) *if*(that's-how-you-say-it<sub>PROP</sub>, groundable(they-had-a-*thermonim*<sub>LOCPROP</sub>))

As the complete utterance cannot be grounded without grounding its constituents, the overall effect remains the same.

We can make this more explicit. Let (145) be our starting point, *B*'s representation of the dialogue state before *A*'s utterance in (142). All fields are empty. Following *A*'s utterance, *dgb1* undergoes the update in (146):

$$(145) \quad B.dgb1 = \begin{bmatrix} \text{Pending} = \langle \rangle \\ \text{Moves} = \langle \rangle \\ \text{Facts} = \{ \} \\ \text{QUD} = \langle \rangle \end{bmatrix}$$

$$(146) \quad B.dgb2 = \begin{bmatrix} \text{MaxPending} = p_u = \\ \quad \left[ \begin{array}{l} \text{sit} = u = \\ \quad \left[ \begin{array}{l} \text{phon} = /ðei əd ə θeɪmənɪm ɪf ðætʰs haʊ jə seɪ ət/ \\ \text{cat} = V[+fin] \\ \text{constits} = \left\{ \begin{array}{l} u_{they}, u_{had}, u_a, u_{thermonim}, u_{if}, u_{that}, u_s, \\ u_{how}, u_{you}, u_{say}, u_{it}, u_a \text{ thermonim}, \dots \end{array} \right\} \\ \text{dgb-params} = \begin{bmatrix} x : \text{Ind} \\ y : \text{Ind} \\ \text{spkr} : \text{Ind} \\ \text{addr} : \text{Ind} \end{bmatrix} \\ \text{cont} = \text{Assert} \left( \text{spkr}, \begin{bmatrix} \text{sit} = s_0 \\ \text{sit-type} = \begin{bmatrix} c_1 = \text{thermonim}(x) \\ c_2 = \text{have}(y, x) \end{bmatrix} \end{bmatrix} \right) \end{array} \right] \\ \text{sit-type} = T_u = \\ \quad \left[ \begin{array}{l} \text{phon} : \text{they had a thermonim if that's how you say it} \\ \text{cat} = N : \text{syncat} \\ \text{constits} = \left\{ \begin{array}{l} \text{they, had, a, thermonim, if, that, 's,} \\ \text{how, you, say, it, a thermonim, ...} \end{array} \right\} : \text{set}(\text{sign}) \\ \text{dgb-params} : \begin{bmatrix} x : \text{Ind} \\ y : \text{Ind} \\ \text{spkr} : \text{Ind} \\ \text{addr} : \text{Ind} \end{bmatrix} \\ \text{cont} = \text{Assert} \left( \text{spkr}, \begin{bmatrix} \text{sit} = s_0 \\ \text{sit-type} = \begin{bmatrix} c_1 = \text{thermonim}(x) \\ c_2 = \text{have}(y, x) \end{bmatrix} \end{bmatrix} \right) : \text{IllocProp} \end{array} \right] \\ \text{Facts} = \text{dgb1.Facts} \cup \text{if}(\text{that's how you say it, groundable}(u_{thermonim})) \end{bmatrix}$$

The dialogue move to potentially ground (*MaxPending*) is an assertion by *A* that *they had a thermonium*. The *if*-clause is not involved in the propositional content of this assertion: as with Csipak's adnominal *if*-clause, it instead applies to an associated

presupposition. In that analysis of adnominal *if*-clauses, the presupposition was triggered by the description itself. In this more metalinguistic case, groundability has been introduced by uncertainty about whether a precondition for that groundability holds. The absence of the *if*-clause in the asserted content can be compared to the non-inclusion of editing phrases themselves in repair, where the repair update of the utterance consists only of the repair material itself (e.g. the replacement of *Michael* with *Martin* in the pending assertion earlier).

The situation in the *if*-clause can be interpreted in a couple of ways, depending on whether one interprets it as addressing how word  $x$  is pronounced, or addressing whether word  $x$  conveys the speaker's intended concept. Where  $\text{Mean}(A, u_{\text{thermonim}}, Q)$ , that speaker  $A$  intended meaning  $Q$  in their utterance of *thermonim*, that condition can be described as either (147) or (148):

(147) Given lexical resource  $X$  such that  $X.\text{cont} = Q$ ,  
that  $u_{\text{thermonim}}.\text{phon} : X.\text{phon}$ .

(148) Given lexical resource *thermonim*, that  $\text{thermonim}.\text{cont} = Q$ .

That is, either (a) for some vocabulary item  $X$  with content  $Q$  that matches the speaker's intended meaning, the utterance of *thermonim* can be recognised as a production of  $X$ , or (b) *thermonim* is a vocabulary item with content  $Q$ .

*Thermonim* is not in addressee  $B$ 's vocabulary:  $B$  can treat *thermonim* as a new word, or as a faulty production of some other word,  $X$ . However,  $A$  has introduced uncertainty about whether their own utterance corresponds to their intended meaning. Given the choice between learning a new vocabulary item and trying to clarify or repair *thermonim*, the LH flag that *thermonim* may be faulty should favour the latter.

The update for these lexical hedging *if*-clauses can be described more generally as follows:

(149) Let  $\text{target}(p : \text{LocProp})$  be shorthand for  $p$  being the plausible target of a metalinguistic comment, through a combination of factors including prosodic focus, proximity to the comment, and being independently recognisable as erroneous or in some way marked (e.g. out of register for the current conversation).

Where  $p_w = \left[ \begin{array}{l} \text{sit} = w \\ \text{sit-type } T_w \end{array} \right] : \text{LocProp}$ ,

and  $\text{ifcl} \in T_u$  classifies the *if*-clause constituent  $u_{\text{ifcl}} \in u$ ,

$$\left[ \begin{array}{l} \text{pre : } \left[ \begin{array}{l} \text{MaxPending} = p_u = \left[ \begin{array}{l} \text{sit} = u \\ \text{sit-type } T_u \end{array} \right] \\ c_{\text{targ}} : u_t \in u.\text{constits} \wedge \text{target}(u_t) \\ c_{\text{if}} : u_{\text{ifcl}} \in u.\text{constits} \wedge u_{\text{ifcl}} = \text{if}(\varphi, ) \\ c_{\text{meta1}} : \neg(\neg\varphi \wedge \text{groundable}(u_t)) \\ c_{\text{meta2}} : w.\text{constits} = u.\text{constits} - u_{\text{ifcl}} \\ \quad \wedge T_w.\text{constits} = T_u.\text{constits} - \text{ifcl} \end{array} \right] \\ \text{effects : } \left[ \begin{array}{l} \text{Facts} = \text{pre.Facts} \cup \text{if}(\varphi, \text{groundable}(u_t)) \\ c_{\text{meta3}} : u.\text{cont} = w.\text{cont} \\ \quad \wedge T_u.\text{cont} = T_w.\text{cont} \end{array} \right] \end{array} \right]$$



For an ungrounded utterance  $u$  containing (i) an *if*-clause that expresses a necessary precondition for groundability (constraints  $c_{if}$  and  $c_{meta1}$ ) and (ii) a plausible metalinguistic target  $u_t$  (constraint  $c_{targ}$ ), the proposition that the *if*-case is antecedent to the groundability of  $u_t$  may be accommodated into the common ground (the *Facts* update), and the content of  $p_u$  equivalent to the utterance without the metalinguistic *if*-clause (constraint  $c_{meta3}$ ). This should not be viewed as ‘cleaning’ metalinguistic material from the content, but identifying it as separate from the assertion, question, etc. that the speaker is trying to perform. It may influence the at-issue content – e.g. indicating a repair may be needed, requesting accommodation of novel meanings – but is not directly incorporated.

### Acceptability Management

Not all uses of sub-sentential metalinguistic *if*-clauses are for managing informational correctness. The *if*-clause in examples like (121) don’t express any precondition on groundability: rather, they address an issue of acceptability and tone.

(121) it is still **peanuts if you’ll pardon the expression Jimmy** compared with the previous incumbent (*ICE-GB S2B-021 017*)

Much as the groundability cases triggered the accommodation of a presupposition about groundability into the common ground, so do these with the acceptability of the utterance.

The notion of acceptability is left underspecified: however, it notionally includes sub-conditions such as the register-appropriateness of the lexical item relative to the current conversation type and speaker relationships. Otherwise this is the same process as the potential issue with groundability: the *if*-clause expresses a necessary precondition for utterance acceptability, this is associated with an identifiable target sub-utterance, while the explicit introduction of the precondition via *if*-clause implies the precondition’s uncertainty. The update rule for groundability-referencing *if*-clauses in (149) is easily adapted, provided we substitute acceptability for groundability in constraint  $c_{meta1}$  (the constraint that the *if*-case is a precondition to acceptability), and in the subsequent update to the mutually accepted facts.

### Lexical Pacts

In the constructed example (142) and corpus example (150), the speaker flags a possible mismatch between lexical meaning and intended meaning, and that they may have failed to identify or produce the correct material. Rather than identifying a mismatch as a potential mistake however, metalinguistic *if*-clauses can highlight and hedge an offered conceptualisation, as in (151).

(150) And my mother, she was a dress maker or **an apprentice dressmaker if that is the correct term.** (*BNC HEM 6*)

(151) So if you think of the nucleus of uranium, lots of protons and lots of neutrons all bunched up together. Er **snooker ball if you like**, whacks into them, a neutron hits them {cough} and scatter them (*BNC FMR 207*)

In (151) the speaker uses *snooker ball* to refer to *the nucleus of uranium*. This is not a standard interpretation of *snooker ball*: it is being introduced as a potential conceptualisation of *the nucleus*, one which may or may not be taken up. As before, explicit

introduction of the non-established *if*-case implies its uncertainty, here indicating that the speaker doesn't assume that the addressee will agree with the offered conceptualisation. As well as acknowledging the addressee's agency, this hedging also helps to indicate that it is a non-standard use of *snooker ball*, and not to be interpreted as usual.

While some cases are clearer than others, there is no sharp distinction between cases where the speaker flags the item due to a possible error, and where they do so due to an offered unconventional usage: in case of rejection, both cases require repair with a mutually accepted term for the speaker's intent. In the first case the speaker hopes to have found (and accurately reproduced) a known term for their intended meaning – in the second, they hope an addressee will accept a potentially non-standard use of the item. Rather than a potentially failed attempt at a standard usage, they are attempting a novel one.

A conceptualisation may be rejected by the addressee for various reasons. We can be conservative in incorporating as many into grounding issues as possible (including the underspecified *if you like* cases), allowing the contextually recognised intended meaning (in (151) the previously-mentioned *nucleus*) into the interpretation of the term.

Ambiguity between whether the potential failure is one of informational groundability or acceptability may be unappealing. However, it does seem to exist, as in (130), repeated in shortened form here:

- (130) 'Peking' if I can still call it like that decreed restraint of parenthood under penalty to one child for each couple (*ICE-GB S2B-048 071*)

Is this a question of whether one is able to call the city *Peking* because *Peking* may no longer be the name of the city in English, or a question of whether it is permissible to do so in the current context? Whatever aspect one takes issue with, a rejection will involve a repair to *Beijing*, and an acceptance will involve accepting the use of *Peking* as a proper name for the city – at least temporarily. In not correcting or objecting to the use of *Peking*, an addressee concedes acceptance of the *if*-case.

## 5.4 Revisiting lone and adnominal *if*-clauses

In the process of investigating lexical hedge *if*-clauses, we also encountered other *if*-clauses in use which lack even a sub-clausal consequent, and adnominal conditionals. In this section we will return to them, from the perspective of analysing LH *if*-clauses as true metalinguistic comments which manage non-content discourse elements.

### 5.4.1 Consequentless *if*-clauses

'Consequentless' *if*-clauses can be divided into three groups: stand-alone uses where no consequent is implied, elliptical uses where the implication of a consequent (albeit unspecified) is present, and derivative uses where a specific consequent can be recovered from context. The first two categories are not entirely distinct, with similar functions appearing with terminal and non-terminal prosody, and with different levels of ease in completion.

- (152) a. If only we'd been here an hour earlier!  
 b. If only we'd been here an hour earlier...  
 (constructed)

Regarding the third category, I do not include retroactive *if*-clauses following a pause or turn-change, like the co-construction by the second speaker in (153), which corrects the first speaker's assertion in order to include an *if*-clause – a correction the second speaker accepts, repeating the new material.

- (153) *Brenda*: You'll study like mad ⟨pause⟩ revise like mad and come out with a C.  
*Lee*: If I'm lucky.  
*Brenda*: If you're lucky. (KBF 13237–9)

The consequent does not need to be derived, only recognised. However, I do include *if*-clauses which provide an answer to polar questions: while derived from the question, the consequent is not the question itself.

### Stand-alone *if*-clauses: directive *if*-clause

As the best-remarked case of stand-alone *if*-clauses, directive *if*-clauses are an ideal test case for connecting the stand-alone *if*-clause with the *if*-clause of conditionals more generally. Although these are stand-alone *if*-clauses, the same directive interpretation can be licensed for antecedents of complete *if*-conditionals in appropriate conditions.

The following two examples illustrate *if*-conditionals used to convey a directive. In the first example, the speaker reports being summoned to a teacher's office. The consequent provides an explanation for why the *if*-case action is desirable, while in the reported reply, the speaker argues against the *if*-case as a solution to the problem. Nevertheless, they confirm to speaker 2 that they followed the instruction. In the second example, a tutor (John) talks a student (Sarah) through using a word processor, observed by the student's mother (Sue). In this example, the *if*-conditional is a hypothetical one describing cause and effect: pressing the key will move the cursor. As well as being informative, this is interpreted as a directive to press the key, followed by an additional instruction to press *delete*.

- (154) *Unknown 1*: and then, and then [last or full name] came up to me and said erm [...] if you **if you go and see [last or full name] this afternoon erm he would like to speak to you** and I was like ⟨pause⟩ he should come and speak to me [...]  
*Unknown 2*: So you went and saw him? ⟨unclear⟩  
*Unknown 1*: so I went and saw him (KPH 480–7)
- (155) *John*: Right. Erm ⟨reading⟩:[ document type ]. Oh so **if you press enter it'll come down one line.**  
*Sue*: Enter. That big key on the side.  
*John*: Or return.  
*Sarah*: That one?  
*Sue*: Yeah.  
*John*: And delete, delete to get rid of the S M. (G4K 100-8)

Contrary to Kaltenböck's argument for conditional/directive-*if* isomorphism, *if*-clauses that license a directive interpretation can still participate in 'conditional' *if*-conditionals. This is not to say that the stand-alone *if*-directive has not *also* been conventionalised to the point of distinction: however, there is no particular conflict in a single *if*-clause

simultaneously being used to perform both functions. Lindström, Laury, and Lindholm (2019) are also critical of the reliance on ellipsis as an explanation for this function, finding *om*-clauses and *jos*-clauses in Finnish and Swedish treated as directives (that is, enacted or acknowledged by the addressee) even when a consequent clause follows.

A directive interpretation of an *if*-clause is available where the *if*-case is an action which includes the addressee as an agent and is within their power, and which is desirable to the speaker. This additional reading does not conflict with interpretation of the *if*-clause relative to the consequent, whether as part of a hypothetical conditional indicating what will follow from the *if*-case like (155), or a higher-level explanation for the implied request like (154).

(156) Directive *if*-clause licensing

$$\left[ \begin{array}{l} \text{pre} \\ \text{effects} \end{array} : \left[ \begin{array}{l} \text{spkr} : \text{Ind} \\ \text{addr} : \text{Ind} \\ \text{LatestMove} = \text{Assert}(\text{spkr}, \psi_\varphi) : \text{IllocProp} \\ c_0 : \text{ident-action}(\phi, \varphi) \\ c_1 : \text{agent}(\text{addr}, !\phi) \\ c_2 : \text{desirable}(\phi, \tau) \end{array} \right] \right]$$

$$\left[ \text{effects} : \left[ \text{Moves} = \langle \text{Request}(\text{spkr}, \text{addr}, !\phi), \text{pre.Moves} \rangle : \text{IllocProp} \right] \right]$$

The prediacte *ident-action* for an identifiable action  $\phi$  in  $\varphi$  is underspecified here, but may be fulfilled in a number of ways: the action described directly in the *if*-clause (*if you wait here*), modalised *if you could wait here*, the object of a desire (or at least assenting) predicate (*if you want to wait here*), or both (*if you'd like to wait here*). The reading as a request may be especially supported by the conversation type. By conversation type, I mean in the sense of conversation genre from Bakhtin (1986), or a particular type of language game. A conversation genre or type, such as a doctor-patient interaction or customer-cashier interaction, will carry expectations for the stages the interaction will have, the goals and subgoals the participants want to achieve, the topics expected to be under discussion, etc. These expectations can direct interpretation of moves in the conversation, with a set of known issues to address, expected interactional steps, and goals to achieve (e.g. examine symptoms, process payment).

Where the *if*-clause is an action within the addressee's power, and can be interpreted as contributing to the goals of the setting (e.g. a step in a contextual task/process), its interpretation as a call for the addressee to add the *if*-case action to their TO-DO list is justified.

(157) Now this is a hexagon. ⟨pause⟩ Erm join that up, okay. ⟨pause⟩ and we should finish up with about six sides roughly. Now ⟨pause⟩ while I finish it off, **if you'd like to just measure** ⟨pause⟩ **one of the interior angles that I've already done.** (FM4 201–4)

The directive *if*-clause is a conventionalisation of this licensing, with a lone *if*-clause including an action within the addressee's ability interpretable as a request for them to add it to their to do list. Stand-alone *if*-clause directives usually appear

with a terminal prosodic contour (Kaltenböck, 2019), and attempts at eliciting ‘completion’ do not always result in *if*-conditionals, with some speakers suggesting non-conditional structure *I wonder if...?*. Recognising them as a conventionalised construction (as (158)) seems correct, with reinterpretation as an ellipsed conditional requiring construction of a suitable consequent from scratch.

(158) Conventionalised directive *if*-clause

$$\left[ \begin{array}{l} \text{dtrs:} \left[ \begin{array}{l} \text{head-dtr:} \left[ \text{cont: (Prop)}if \right] \\ \text{comp-dtr:} \left[ \begin{array}{l} \text{DGP-comp:} \left[ \text{addr: Ind} \right] \\ \text{dgb-params: DGP-comp} \\ \text{cont: Prop} \end{array} \right] \end{array} \right] \\ c_0: \text{ident-action}(\phi, \text{dtrs.comp-dtr.cont}) \\ c_1: \text{agent}(\text{comp-dtr.dgb-params.addr}, \phi) \\ c_2: \text{desirable}(\phi, \tau) \\ \text{dgb-params:} \left[ \begin{array}{l} \text{dtrs.comp-dtr.dgb-params: DGP-comp} \\ c_t: \tau \in \text{Topoi} \end{array} \right] \\ \text{cont} = !\phi: \text{Outcome} \end{array} \right]$$

The characterisation in (158) describes a stand-alone *if*-clause construction, formed of *if* and a complement with propositional content. Some identifiable action  $\phi$  can be derived from the situation in the *if*-case, which is desirable according to some topos in the context, and of which the addressee is a potential agent. In this case, the content of the *if*-clause in this conventionalised construction is simply an Outcome based on this desirable action.

Where an *if*-clause fulfils the criteria for licensing a directive reading of conditional-forming *if*-clauses, it can be interpreted directly as providing material for an imperative. Depending on level of conventionalisation, a consequent may be implicit, and projected in addition to the directive licensing, or may be entirely absent.

### Elaborative *if*-clauses

The second class of insubordinate clauses are elaborative, that is, syntactically independent but still pragmatically dependent on another element in the discourse. As a result, they do not contribute to syntactic-semantic content composition in the same way as fully integrated conditionals. However, they do contribute to discourse on the basis of their relation to another element.

LH *if*-clauses and the *if*-clauses of other metalinguistically interpreted conditionals can be identified as elaborative from this point of view.

*If*-clauses which answer polar questions can be also be identified as elaborative, depending as they do on the question. For a polar question  $?\psi$  and an *if*-clause *if*  $\varphi$ , an *if*-clause polar question answer can be described as follows:

(159) *If*-clause polar question answer

$$\left[ \begin{array}{l} \text{pre} \\ \text{effects} \end{array} : \left[ \begin{array}{l} \text{spkr} : \text{Ind} \\ \text{addr} : \text{Ind} \\ \text{LatestMove} = \text{Ask}(\text{addr}, ?\psi) : \text{IllocProp} \\ \text{LatestMove} = \text{Assert}(\text{spkr}, \text{if}(\phi, \psi)) \end{array} \right] \right]$$

In effect, responding to a polar question with an *if*-clause has the same informational result as responding with a conditional with the affirmative polar answer *yes* as consequent, i.e. for the question “Are you going?”, the responses “Yes if we get tickets”, “We are going if we get tickets”, and “If we get tickets” are equivalent. As a remark, this in itself is informative about how polar questions should be modelled, as even without an explicit *yes*, it is the equivalent of an affirmative answer which becomes consequent content. The functioning of *if*-clause answers is another mark in favour of analyses in which the question itself highlights one of the two binary answers.

#### 5.4.2 Another look at Csipak (2017)

The analysis of adnominal *if*-clauses by Csipak (2017) was identified earlier as the best available, but it does have a couple of quirks in that (i) it uses a generally dispreferred semantics for definite descriptions, with a semantic divide between definite descriptions used attributively and referentially, and (ii) it does not distinguish between true adnominal *if*-clauses, which interact with the content (albeit the not-at-issue content) of the description, and metadiscursive *if*-clauses. Regarding the first point, if the main mechanics of this adnominal analysis can be transferred to a more widely accepted semantics, i.e. if they don’t depend on a hardwired attributive/referential distinction, that can only be a good thing. Regarding the second, we have already argued that sub-sentential metadiscursive *if*-clauses are a distinct use to adnominal *if*-clauses. More generally, as it uses a restrictor-based characterisation of *if*, the analysis requires the existence of some operator to restrict. In a parallel to repair, we are already motivated to apply the *if*-clause to non-content discourse elements. Having to embed all of these *if*-clause-affected elements under e.g. an epistemic modal is a consistent cost it may be preferable to avoid.

We discussed referentially used definite descriptions when introducing Csipak’s adnominal back in Section 5.2.2, repeated here:

(106) *Csipak’s definite referential description:*

$$\llbracket \text{the}_{\text{ref}} \alpha \rrbracket = \iota x \bullet \forall w' \in \text{Best}(\cap f(w)) : \alpha(x) \text{ in } w'$$

Turning to referentially used indefinite descriptions, Csipak follows Fodor and Sag (1982) who make a similar semantic ambiguity analysis of referential and non-referential indefinite descriptions. The referentially used indefinite *some*  $\alpha$  identifies an individual  $x$ ; and conveys that  $\alpha(x)$ , as in (161b) where  $\alpha = \text{soc}$ , a *soccer player* predicate. As Csipak observes in her examples (9) and (10), repeated here as (161a) and (162a), this  $\alpha(x)$  descriptive content is usually at-issue and can be easily denied. On the addition of an adnominal *if*-clause however, it loses its at-issue status. In Csipak’s terms,  $\alpha(x)$  goes from being unmodalised at-issue content in (161b) to modalised not-at-issue content in (162b).

(160)  $\llbracket \text{some}_{\text{ref}} \alpha \rrbracket = x.\alpha(x)$

- (161) a. *A (pointing to a man at the bar):* Some soccer player has just arrived.  
           *B:* No, that's not true. That's my priest.  
       b. *some soccer player:*  
            $x.\text{soc}(x)$
- (162) a. *A (pointing to a man at the bar):* Some soccer player, if that's what he is, has just arrived.  
           *B:* No, that's not true. # That's my priest.  
           *B':* No, that's not true. He's been there the whole time.  
       b. *some soccer player, if that's what he is:*  
            $x \bullet \forall w' \in \text{Best}(\cap f(w) \cup \text{soc}(x)) : \text{soc}(x) \text{ in } w'$

To account for this contrast, Csipak makes a claim about the nature of adnominal *if*-clauses: they force their target content into not-at-issue presuppositional status.

From a more general perspective, the referential use is the non-standard problem case for definite descriptions: if we remove the potential semantic distinction (e.g. as argued by Kripke, 1977), the semantics accepted for attributive uses is what will remain. With this in mind, compare the referential definite description in (160) with a standard Fregean-Strawsonian semantics for attributive definite descriptions (or for definite descriptions in general):

- (163) *Fregean-Strawsonian definite description:*  
            $\llbracket \text{the } \alpha \rrbracket = \iota x.\alpha(x)$

The contrast between (163) and (106) is the contrast between (161a) and (162a): 'bare' and at-issue vs. epistemically modalised and not-at-issue. The proposed semantic difference between referential and attributive definite descriptions is recreated within referential indefinite descriptions through the addition of an adnominal *if*-clause.

This is not intended as an active argument against the analysis that the descriptive  $\alpha(x)$  is not-at-issue content once the *if*-clause is added. However, if we *can* add the modalisation and demote the content to not-at-issue by adding an adnominal *if*-clause, then there is no need to enforce the distinction for this analysis to work.

If we take a pragmatic approach to referential interpretation of descriptions, discarding a special semantics for referential uses, this behaviour of adnominal *if*-clauses would replicate (107b) for the Fregean-Strawsonian semantics, without a pre-requisite to semantically hard-code head-of-accounting( $x$ ) as modalised and not-at-issue. If we accept these adnominal *if*-clause effects we should have no problem in transferring Csipak's adnominal *if*-clause analysis to a unified treatment of definite descriptions.

Having observed the use of the adnominal *if*-clause to demote descriptive content to not-at-issue, we can question the necessity of the epistemic modalisation. Consider another example, the nonrestrictive clause from Csipak's (17b):

- (164) *Kim, who is Alex's spouse,:*  
            $k \bullet \text{Alex's-spouse}(k)$

Although not-at-issue, it is not modalised. Epistemic modalisation is thus not being proposed as a universal treatment for not-at-issue content. If it is intended as a general way to handle presupposition, it might be more universal to talk about the targeted content being presuppositionalised rather than modalised – with this being modal or not depending on your preferred analysis. It is not clear that anything is gained in modalising the presupposition specifically for referential definite descriptions, apart from making them amenable to adnominal *if*-clauses. To avoid committing to treating

presuppositions as inherently modal, or if one prefers a non-restrictor analysis for *if*, the modality could be removed from this proposal and its principles still operate.

Section 5.3.1 already argued that LHs are a distinct phenomenon from adnominal *if*-clauses, but having discussed that Csipak's proposal for adnominal *if*-clauses involves an epistemic modal, we can also note LH examples like the following:

(165) you're simply if you like 'churning out' kind of one play after another (ICE-GB S1B-050 081)

(166) it is 'autosuggestion' if I might use that word (ICE-GB S1B-070 095)

In Csipak's analysis the *if*-clause limits a claim: *the head of accounting* in (105b) is only presupposed as applicable in the speaker's best epistemically accessible worlds *where Campbell gets fired*. The addressee's acceptance of the term in (165), or whether the speaker has permission to use it in (166), have no bearing on whether the action counts as an instance of *churning out* or *autosuggestion* to the best of the speaker's knowledge. Treating these *if*-clauses as limiting something epistemic seems inappropriate. To handle these as non-epistemic cases then, either we would need to alter the nature of the modal aspect, or treat them as distinct from 'true' adnominal *if*-clauses. We are already motivated to do the latter. From the perspective of Csipak's original analysis, this is additional reason to recognise a true adnominal vs. metadiscursive *if*-clause distinction.

To summarise, the pertinent principle of this adnominal *if*-clause analysis is the direct conditioning of an independently motivated aspect of the semantics, rather than posing additional covert content. Arguments for distinguishing between the adnominal and sub-utterance metadiscursive uses of *if*-clauses, rather than collapsing them, remain – and if anything may clear up some things for this proposal.

The paper does additionally argue for a definite descriptions as being semantically ambiguous between referential and attributive meanings – but this turns out to be redundant for the purposes of adnominal *if*-clauses. The treatment of indefinite descriptions depends on adnominal *if*-clauses altering the presuppositional and at-issue status of the descriptive  $\alpha(x)$  content, and doing so in just the same way that would produce the proposed semantics for referential definite descriptions. Therefore, the account of adnominal *if*-clauses does not depend on referential definite descriptions being semantically distinct – and can be detached from the semantic ambiguity assumption about definite descriptions.

### 5.4.3 An alternative route to adnominal conditionals

Above, we used a non-committal gloss *if*( , ) to refer to the *if*-clause and its consequent. We will reconsider adnominals under a non-restrictor analysis, underspecified for now, preserving Csipak's principles. The use of a non-restrictor analysis has the advantage of no longer requiring the presence or accommodation of an operator on anything the *if* might affect.

Descriptions will be treated following Ginzburg (2012), where referential descriptions are included as fields on the dialogue gameboard, or are otherwise existentially quantified. As before, the content contributed to the sentence is the individual, whether existentially quantified or accommodated as a referent. The descriptive content is likewise a contextual parameter, either included in the dialogue gameboard, or as a quantified parameter.



In the referential case, the individual and the descriptive content are a contextual constraint on the dialogue gameboard: in the non-referential case they are not. In both cases there is a distinction between the referenced individual  $x$  and the description  $\text{dog}(x)$ .

(167) *the dog* (referential)

$$\left[ \begin{array}{l} \text{dgb-params} : \left[ \begin{array}{l} x : \text{IND} \\ r_0 : \text{dog}(x) \end{array} \right] \\ \text{cont} : \left[ x = \text{dgb-params}.x : \text{IND} \right] \end{array} \right]$$

(168) *a dog* (non-referential)

$$\left[ \begin{array}{l} \text{q-params} : \left[ \begin{array}{l} x : \text{IND} \\ r_0 : \text{dog}(x) \end{array} \right] \\ \text{cont} : \left[ x = \text{q-params}.x : \text{IND} \right] \end{array} \right]$$

It is at this point I will expand the gloss of *if*( , ) with something more specific, to be further developed in Chapter 6.

We have been using an Austinian model of propositions, with truth based on the match between a situation and situation type, that *sit* : *sit-type*. This is itself a judgement, relative to some possibility  $p_0$ . Let *if*( $\alpha$  : *Prop*,  $\beta$  : *Prop*) have the effect of a change of context of evaluation for  $\beta$ , such that the fields of  $\beta$  are to be evaluated relative to some possibility  $p'_0$  where  $\alpha$  is true. Where subscript on the judgement indicates the possibility then, let *if*( $\alpha$  : *Prop*,  $\beta$  : *Prop*) indicate the update on  $\beta$  from (169) to (170), updating the possibility of evaluation of its fields from  $p_0$  to  $p'_0$ :

$$(169) \left[ \begin{array}{l} \text{sit} : p_0 \text{ Rec} \\ \text{sit-type} : p_0 \text{ RecType} \end{array} \right]$$

$$(170) \left[ \begin{array}{l} \text{sit} : p'_0 \text{ Rec} \\ \text{sit-type} : p'_0 \text{ RecType} \end{array} \right]$$

This context-of-evaluation change can now be applied to an adnominal use, using the example *the head of accounting if Campbell gets fired*.

Where the *if*-clause affects the not-at-issue description rather than the at-issue content, the descriptive content (constraint  $r_0$  that  $x$  is head-of-accounting) becomes relative to possibility  $p'_0$ , a potential further definition of the original context of evaluation  $p_0$  in which the antecedent *Campbell-gets-fired*<sub>PROP</sub> is true (specified in  $r_1$  and  $r_2$ ). Let  $\beta$ .poss designate the possibility used for judgements in  $\beta$ .

(171) a. *the head of accounting*

$$\left[ \begin{array}{l} \text{dgb-params} :_{p_0} \left[ \begin{array}{l} x :_{p_0} \text{IND} \\ r_0 :_{p_0} \text{head-of-accounting}(x) \end{array} \right] \\ \text{cont} :_{p_0} \left[ x = \text{dgb-params}.x :_{p_0} \text{IND} \right] \end{array} \right]$$

b. *the head of accounting if Campbell gets fired*

$$\left[ \begin{array}{l} \text{dgb-params} \\ \text{cont} \end{array} \begin{array}{l} :_{p_0} \left[ \begin{array}{l} x \quad :_{p_0} \text{IND} \\ r_0 \quad :_{p'_0} \text{head-of-accounting}(x) \\ r_1 \quad :_{p_0} p_0 \sqsubseteq p'_0 \vee p_0 \sqsupseteq p'_0 \\ r_2 \quad :_{p_0} \text{Campbell-gets-fired}_{\text{PROP.poss}} = p'_0 \\ \quad \wedge \text{TrueProp}(\text{Campbell-gets-fired}_{\text{PROP}}) \end{array} \right] \\ :_{p_0} [x = \text{dgb-params}.x \quad :_{p_0} \text{IND}] \end{array} \right]$$

Where Campbell keeps the job,  $r_1$  is violated, and  $p'_0$  cannot be used for evaluation. Like a typical conditional, the description can be rephrased to establish the *if*-case as counterfactual, à la *the head of accounting if Campbell had been fired is currently sulking in the corner*. The description of  $x$  as *the head of accounting* is false in  $p_0$ , but their description as *the head of accounting if Campbell gets fired* is valueless once Campbell keeps the job (whereas *the head of accounting if Campbell had been fired* can still be evaluated for counterfactual possibility  $p_1$ ).

On the basis of this more specified *if*, the LHs can also be given a little more detail. The effects on the dialogue state originally given in (149) can be modified to the following. For the reduction of visual clutter the specification of  $p_0$  as the default possibility has been removed, but should be assumed where a judgement is not explicitly indicated as being otherwise.

$$(172) \left[ \begin{array}{l} \text{pre} : \\ \text{effects} : \end{array} \left[ \begin{array}{l} \text{MaxPending} = p_u = \left[ \begin{array}{l} \text{sit} = u \\ \text{sit-type } T_u \end{array} \right] : \text{LocProp} \\ c_{\text{targ}} \quad : u_t \in u.\text{constits} \wedge \text{target}(u_t) \\ c_{\text{if}} \quad : u_{\text{ifcl}} \in u.\text{constits} \wedge u_{\text{ifcl}} = \text{if}(\varphi, ) \\ c_{\text{meta1}} \quad : \neg(\neg\varphi \wedge \text{groundable}(u_t)) \\ c_{\text{meta2}} \quad : w.\text{constits} = u.\text{constits} - u_{\text{ifcl}} \\ \quad \wedge T_w.\text{constits} = T_u.\text{constits} - \text{ifcl} \\ r_1 \quad : \varphi.\text{poss} = p'_0 \wedge \text{TrueProp}(\varphi) \\ r_2 \quad : p_0 \sqsubseteq p'_0 \vee p_0 \sqsupseteq p'_0 \\ \text{Facts} = \text{pre.Facts} \cup \\ \left[ \begin{array}{l} \text{sit} \quad :_{p'_0} \text{Rec} \\ \text{sit-type} \quad :_{p'_0} [r_0 : \text{groundable}(u_t)] \end{array} \right] : \text{Set}(\text{Prop}) \\ c_{\text{meta3}} : u.\text{cont} = w.\text{cont} \wedge T_u.\text{cont} = T_w.\text{cont} \end{array} \right] \right]$$

The update relative to (149) lies in the specification of the effects of the *if*-clause with the restrictions  $r_1$  and  $r_2$ , through setup in the precondition state *pre*, and a more explicit description of the proposition about groundability which is added to *Facts* in the subsequent effect state.

This allows a split in the ‘adnominal’ *if*-clause data between (a) true adnominal *if*-clauses, where the *if*-case is associated with the description, and (b) metalinguistic *if*-clauses which happen to be used on a nominal segment, where the *if*-case is associated with a presupposition about the utterance. This does not have to mean a major

semantic ambiguity between multiple types of *if*-clause: the same action is at work, guided to a metalinguistic-level interpretation based on the content of the *if*-clause itself.

## 5.5 Conclusion

In this chapter, we focused on metalinguistic *if*-clauses used to manage sub-clausal utterance segments. The correct treatment of metalinguistic conditionals is a long-standing issue, and these neglected sub-clausal instances provide an excellent problem case, as they immediately violate the assumptions behind a number of solutions to metalinguistic conditionals with full-clause consequents. At heart, an underlying issue in analysing these cases has been that they are a communication management tool, which have been addressed in frameworks not intended for fine-grained metadiscursive modelling. Instead, they require an explicit interface with a conversational context which includes multiple levels of representation in detail. From a more dialogical perspective, a parallel was identified between these *if*-clause uses, and utterance repair. Higher-level discourse elements based on speech events must already be identifiable in the context for resolution of clarification and utterance repair, and can be managed via these *if*-clauses in a similar way.

The proposal that *if*-clauses apply to non-content elements is not arbitrary: it also fits with a more general process of extension, the re-interpretation of subordinate clauses relative to higher-level discourse elements. The syntactic disconnect this implies is also supported in syntactic literature, although this work tends to solve the syntactic-disconnect problem through additional layers of syntax.

This is partly in conflict with pragmatic analyses of biscuit conditionals such as that by Biezma and Goebel (2019), who account for them by maintaining the usual truth-conditional semantics found in hypothetical conditionals, but resolving the felicity requirement through indirect means. While the principle of re-interpretation from a direct to an indirect relation can be maintained, the argued-for underlying composition of the semantic content of the antecedent and consequent is less motivated in light of *if*-clause uses which lack direct semantic compositionality, as illustrated by metalinguistic *if*-clauses on utterance segments with content which cannot be normally affected by an *if*-clause. However, this need not require a fundamentally different meaning for the *if*-clauses involved in metalinguistic management – just an alternative interpretation of where they apply, one consistent with pre-existing accounts of repair and clarification.

## Chapter 6

# Conditionals in Dialogue

### 6.1 Introduction

In this chapter, my goal is to recontextualise the observations of the previous chapters with reference to more general analyses of conditional semantics. Following a quick recap of some semantics of conditionals, a short commentary on existing work on speaker judgements will add another perspective. Considering a variety of *if*-‘conditionals’ in this context, I will suggest that a trivalent dynamic variably strict conditional is a productive way forward, with a similarity ranking based on inference.

Section 6.2 briefly revisits what we have previously seen, first by providing a reminder of some current theories of conditional meaning, and then highlighting non-hypothetical conditionals from outside the central conditional literature and what we saw in the corpus study data. Section 6.3 is by necessity limited in scope, but highlights some recent results on speaker judgements about conditionals, in particular as a function (or not) of an inferential relationship between the antecedent and consequent cases. With this perspective in place, Section 6.4 settles on a variant of the dynamic variably strict conditional as a way to best handle this variation. Section 6.5 uses this to then walk through a number of corpus examples.

### 6.2 A quick recap

#### 6.2.1 Meaning

The standard semantics of the conditional is a bivalent variably strict semantics. Where the strict conditional is true provided the consequent is true in all antecedent worlds, the variably strict conditional is relative only to the set of worlds already picked out by the antecedent, according to some ranking (classically a similarity measure per Stalnaker (1968) and Lewis (1973)). In doing so it avoids the strict conditional’s issues with inferences around strengthening of the antecedent, contraposition, and transitivity – when it comes to strengthening the antecedent for example, that consequent  $\psi$  is true in all of the maximal  $\varphi$  worlds does not imply for a variably strict conditional that it is true in all of the maximal  $\varphi \& \rho$  worlds (or in Stalnaker’s case, *the* maximal world).

One alternative (Fintel, 2001; Gillies, 2007; Gillies, 2010) is a bivalent dynamic strict conditional. The dynamic strict conditional maintains a strict conditional semantics, but replicates the effects of variability through affecting the contextually relevant possible worlds. This reproduces a variably strict semantics for lone and discourse-initial conditionals (provided the same ordering is used for the dynamic expansion of the ‘modal horizon’ as is used for selecting the maximal world(s) for the variably strict

conditional), but also predicts the results for reversed Sobel sequences (i.e. that they cannot be reversed), which are unexpected under a variably strict approach.

Starr (2014) offers an alternative solution to reverse Sobel sequences with a dynamic variably strict conditional, combining a variably strict conditional with a dynamic context that tracks multiple sets of information. The variably strict conditional is typically implemented in dynamic semantics in a few steps. First, a context update with the antecedent to create a temporary context in which the antecedent proposition is true. Second, an update with the context to that temporary context with the consequent. Finally, the temporary context is dropped, integrating the information from the previous step into an update of the main context. In Starr's dynamic conditional, the creation of the *if*-case context is not only a temporary mechanic, but persists in the context as a distinct body of information which can be referenced again. Sobel sequences are then handled as in the original variably strict conditional, while reverse Sobel sequences become a case of modal subordination, a continued discussion about the same body of information.

While the above were variants on a bivalent semantics for conditionals, another approach is to treat conditionals as trivalent, typically according to the Finetti (1936/1995) truth table. A trivalent analysis of conditionals is motivated partly by practical concerns, and partly by intuition. Practically, it solves the triviality problems that restrictor-based composition is used to solve for bivalent semantics, keeping the semantic issue 'in house' – that is, rather than solving it through a composition that depends on the presence of another element, the semantic framework itself is adjusted. The intuitive level is motivated by a sense that indicative conditionals are neither true nor false once their antecedent is falsified, especially obvious in betting conditionals. The analysis of *if* as a restrictor on an operator, rather than an operator in its own right, helps maintain a bivalent semantics. Where no overt operator is present, the bivalent conditional then requires a covert operator to be identified or posed. We also saw this in Csipak's modernisation of the adnominal conditional analysis, where the descriptive aspect of a description is treated as modalised. A trivalent semantics then, can avoid this need for an external operator.

## 6.2.2 What have we seen?

Harking back to the corpus study in Chapter 3, there are a few uses of conditionals we want to keep in mind.

As discussed, *if*-clauses used metalinguistically are well-recognised, but behave differently to hypothetical conditionals, while the target analyses for handling them are inappropriate for extension to hypothetical conditionals. One recent analysis of biscuit conditionals maintains the underlying truth-conditions of hypothetical changes, and identifies a difference in how felicity conditions are resolved (Biezma and Goebel, 2019), connecting them to question-answer sequences in discourse. However, more obviously metalinguistic cases are not appropriate for a shared semantic analysis, as illustrated by e.g. the contrast in possible position for adnominal *if*-clauses versus metalinguistic *if*-clauses related to utterance segments containing nominal material. Instead, in Chapter 5 I considered the notion of the functional extension of subordinate clauses from matrix clause content to higher discourse elements, a cross-linguistically attested pattern. Discussion of metalinguistic conditionals has approached in various ways the idea that they apply to non-content discourse elements. With treatments of repair and a richer context representation in mind, I concluded that this doesn't have

to be disconnected from how hypothetical conditionals work. Related to this, we observed *if*-clauses with no consequent which nevertheless contribute to the dialogue state. Although not discussed, the corpus data also attested to *if*-clauses where the ‘consequent’ appears to be an impression or a direct quote.

More conventionally, *if*-clauses can be attached to other clause types to create conditionalised questions and imperatives.

### 6.3 What else do we know? Judgements about conditionals

Hypothetical and premise/factual conditionals can be collapsed into a single class, with the distinguishing features of premise conditionals explicable via information structure (Mayol and Castroviejo, 2017). Of Iatridou’s original tripartite distinction, this leaves us with hypothetical conditionals (indicative and subjunctive) and metalinguistic conditionals. There is a wealth of research into how speakers judge and respond to hypothetical conditionals. A few general patterns and individual results are reviewed below, in particular concerning the presence of third-value judgements, and the possible relationship between truth-value judgement and identification of a link between antecedent and consequent. The truth of the antecedent and consequent states will be given in short by a standard TT, TF, etc.

As discussed in the chapter on enthymemes, there is a relevance aspect to speaker acceptance of conditionals, which mirrors (though it is not identical to) judgements about the probability of the consequent in the antecedent case. Conditionals formed with negative relevance or irrelevance between the antecedent and consequent having lower probability and acceptability ratings than otherwise predicted by the conditional probability  $P(C|A)$  (Skovgaard-Olsen, Singmann, and Klauer, 2016). The tasks in Skovgaard-Olsen, Singmann, and Klauer (2016) and Skovgaard-Olsen et al. (2017) used contentful stimuli, where rather than arbitrary combinations of content (e.g. shapes, colours), the conditionals were populated by scenarios viewed to be in a relationship of positive relevance, negative relevance or irrelevance, as confirmed by pretest (also varying high and low probability of the antecedent and consequent themselves). For example, one scenario and some associated conditionals from Skovgaard-Olsen, Singmann, and Klauer (2016) are as follows,<sup>1</sup> with HH indicating high antecedent probability and low consequent probability, etc:

- (173) *Scenario*: Paul is driving on a straight road with hardly any traffic ahead. He is on his way to work in an investment bank and is running late. At this point the drive will take about one hour and he is supposed to arrive in 40 minutes.

*Pos. rel., LL*: If Paul pushes down the brake pedal, then the car will slow down

*Neg. rel., HH*: If Paul’s car is functioning normally, then he will be late for work.

*Irrel., HL*: If Paul is wearing a shirt, then his car will suddenly break down.

By varying relevance across the conditional probability  $P(C|A)$  (Skovgaard-Olsen, Singmann, and Klauer, 2016) and the truth status of antecedent of consequent (Skovgaard-Olsen et al., 2017), the relationship between probability, truth, relevance, and acceptability can be somewhat unpicked. While their acceptability (and rated probability) dropped with perceived relevance, truth judgements for conditionals in the TT and

<sup>1</sup>Data available at <https://osf.io/9zja2/>

TF cells remained stable across relevance conditions. That is, those TT conditionals rejected as unacceptable under the condition of irrelevance or negative relevance still retained their evaluation as true, even as the judged probability of the conditional diverged from  $P(C | A)$ , and tracked instead with the lower acceptability rating.

On that basis, varying the relevance condition to irrelevance or even negative relevance does not appear to greatly affect truth judgements in the case where the antecedent is confirmed as true. If the inference pattern is explicit and unambiguous however, some participants violate centring, and make F evaluations of a conditional despite confirmation of a TT state.

Douven et al. (2018) and Douven et al. (2019) used stimuli with clear inference patterns, soritical series based on object size or a colour gradient: the colour gradient stimulus, for example, was a sequence of colour patches from unambiguously blue patch number 1 on the left, to unambiguously green patch number 14 on the right (presented visually or by description only, depending on experimental condition). These soritical series provide an explicit direction of inference, and in case of the visual presentation of the colour gradient, also allow speakers to make independent judgements about the truth of the antecedent and consequent, recorded in a pre-test.

Even when participants had independently judged antecedent and consequent to be true, 32% of responses violated centring where the direction of the conditional was incongruent, i.e. the consequent was counter to the direction of inference (vs. a 10% centring violation rate for congruent TT conditionals). For example, suppose squares 12 and 13 have been judged green by a participant, and the two states to use in forming a conditional are that 12 is green, and that 13 is green. A conditional in the 'incongruent' direction, where the consequent patch is closer to the blue end of the scale than the antecedent patch, is more likely to be judged false than one in the 'congruent direction', where the consequent patch is closer to the green end than the consequent patch – even though both patches have been already judged as green by that participant.

Oaksford and Chater (2020) suggest that the general TT=T response to conditionals with negative relevance found by Skovgaard-Olsen et al. (2017) is not necessarily in contradiction to inference as a driver of truth evaluation. While a contentful conditional (like those in the Skovgaard-Olsen, Singmann, and Klauer (2016) stimuli) may have an antecedent and consequent judged to be in negative relevance, a positive confirmation of the truth of antecedent and consequent may be treated as evidence of an exceptional case, with an unknown alternative explanation. Their particular example is *if you hit the breaks, the car will speed up*. While we expect this to have clear negative relevance, once presented with the scenario where the breaks were slammed and the car went faster, we can conclude that there is something (surprisingly) different about this *particular* car, and that if you hit the 'breaks', it will in fact accelerate. Despite the expected negative relevance, it turns out that this conditional was true after all.

This potential for alternative explanations is blocked by the soritical series used by Douven et al. (2018). In fact, the contrast in the two sets of results in their found levels of TT=F responses to negative relevance conditionals may suggest exactly this strategy. Allowing an alternative explanation in view of unexpected evidence may be why the contentful TT evaluation remains relatively stable across positively and negatively relevant conditions, while the rate of TT=F for the incongruent soritical conditionals, which have no such room for inferential manoeuvre, is triple the TT=F

rate for congruent soritical conditionals.<sup>2</sup>

Turning to truth values more generally, third-value judgements in false antecedent states are well-attested, and tend to be more prevalent among participants with higher cognitive ability (Evans et al., 2008). However, the rate of # responses drops considerably when the falsification of the antecedent is explicit rather than implicit (Schroyens, 2010). That is, when the falsification of the antecedent of “if it’s a square, it’s blue” takes the form of “it’s not a square” rather than “it’s a circle”, participants are more likely to make a binary judgement of true or false about the conditional. There is also a pattern to the non-# values: the modal judgement in FF states becomes T,<sup>3</sup> not #, while in FT states it becomes F. While we may want to introduce a third value into the system then, even false antecedent cases require some strategy.

## 6.4 Where might we go? A proposal.

In light of all the above, I think this leans toward a trivalent dynamic variably strict conditional. That is, admission of a # truth value into the system, combined with a dynamic variably strict conditional (following Starr (2014)) which (a) introduces a possibility for discussion to the common ground via *if*-clause, and (b) undergoes evaluation based on inference relations.

First, as generally acknowledged, the variably strict conditional can be built on inferential relations, using causal networks/structural equations to determining the initial scenario selected by the antecedent. Second, where the *if*-clause introduces a possibility to context, this makes it a potentially more general effect amenable applicable to higher discourse objects – especially if we can model them in the same system.

This makes a hypothetical conditional not the direct assertion of an inferential link, but an assertion of the consequent proposition in a possibility where the antecedent is enacted. In doing so however, we can expand the general notion to other uses of *if*-clauses through a richer representation of the (dynamic) dialogue state and elements therein, especially through distinguishing semantic content, identified speech act and speech event.

The rest of this section is divided into two parts. First, the model of the information state will be extended to include tracking of alternative bodies of information, or possibilities. Existing background for handling multiple possibilities in TTR is introduced to provide some basic tools, and then extended for use in the KoS dialogue state model. In doing so we can take advantage of the Austinian approach to propositions, and specify the possibility of evaluation directly. Second, the *if*-clause is characterised using these tools as an operator which alters the possibility of evaluation for its consequent material to one generated by applying the causal *do* operator to the current

<sup>2</sup>It is worth mentioning that materials for Skovgaard-Olsen et al.’s tasks also included the marker *then*, and the conditional materials in Douven et al.’s tasks had consequents phrased in the form *so is x* rather than phrased in isolation as *x is [value]*. In both cases, this may encourage inferential interpretation. Ideally, these could be replicated using *if* only, to avoid interference with the relevance/inference effect of the ‘plain’ conditional itself.

<sup>3</sup>Similar to the high level of TT=F judgements for incongruent soritical conditionals, Douven et al. (2018) found an unusually high rate of FF=F judgements for incongruent soritical conditionals. In Douven et al. (2019), the correlation between judgement and inference congruence (rather than just the truth status of antecedent and consequent) motivates an analysis of the semantics of conditionals as their truth requiring an inferential connection between components.



possibility. Section 6.5 will then walk this through corpus examples other than hypothetical conditionals.

### 6.4.1 Modifying the information state setup

#### A background to possibilities

The idea of altering the possibility relative to which a judgement is made was approached at the end of the previous chapter: it will be given some more detail in this subsection. The dialogue gameboard is agent-relative: it represents one individual's judgement of the dialogue state rather than being any kind of external objective truth. In addition to being agent-relative, judgements are also possibility-relative. A judgement is made according to some system or standard: in the same way a specific standard for judgement may track a specific agent's judgement system, so may different standards also represent their judgements about different hypothetical or counterfactual possibilities. More than agent-relative judgement, an individual agent may make judgements about distinct possibilities.

A type-theoretic world in TTR – for our purposes, a possibility – can be defined as follows:

(174) **Type-Theoretic World (Cooper, 2012, simplified)**

TYPEDWORLD =  $\langle \text{Type}^n, \text{BasicType}, \text{ComplexType}^n, \text{RecType}^n, \langle A, F^n \rangle \rangle$

- a.  $\text{Type}^n$  is the set of types of order  $n$ , built up recursively using type construction operations.
- b.  $\text{BasicType}$ : IND, TIME, LOC, ...
- c.  $\text{ComplexType}^n$  ('interface with external reality'): tuples consisting of entities [from the model] and predicates.
- d.  $\text{RecType}^n$ : set of records, record types defined with respect to a set of objects used as labels.
- e.  $\langle A, F^n \rangle$  is a model ( $A^n$  assigning entities to  $\text{BasicType}$ , and  $F^n$  assigns tuples to  $\text{ComplexType}^n$ ).

(Ginzburg, 2012)

For member of  $\text{BasicType}$   $T_b$ , the range of  $A(T_b)$  will be a set of witnesses of  $T_b$  in the model, with  $F^n(T_c)$  likewise for any type  $T_c \in \text{ComplexType}^n$ . Less formally, it is made up of sets of types (basic types, like IND, complex types defined by combining predicates and entities, like *cat(mitzi)*, and record types), and a model assigning entities to those types ( $A^n$  for basic types, and  $F^n$  for complex types).

In the above definition  $n$  indicates a level of stratification: this is not especially relevant for current purposes. Suffice it to say that all of the elements of  $\text{Type}^0$  are themselves of type *Type* – since this is a type, it too should theoretically be in  $\text{Type}^0$ . Having higher levels of the system allows avoidance of Russell's paradox, where this *Type* is a member of  $\text{Type}^1$  which also contains all members of  $\text{Type}^0$ , and so on to  $n$ . Where  $M^n$  is an individual type system as given in (174), an intensional type system  $\mathcal{M}$  includes all levels of stratification for the system. Hereafter, talk of stratification will be left aside.

Following Cooper (*Type theory and language: From perception to linguistic communication*), a modal type system is a family of various  $\mathcal{M}$ , i.e. various possibilities, with alternative object-type assignments. It is at this point I will revert to a convention of  $p$

for a possibility. Some situation  $s$  which is of type  $T_0$  in possibility  $p_0$  may not be type  $T_0$  in possibility  $p_1$ , and may not exist at all in  $p_2$ , and have no type assignment there.

$$(175) \quad s \in p_0(T_0), s \notin p_1(T_0), \nexists T \in \text{Type}_{p_2} \text{ s.t. } s \in p_2(T)$$

In this way we can deal with alternative or hypothetical typings of situations and entities without committing to that judgement about reality. Agents can manage bodies of information about possibilities other than their reality, their default possibility of evaluation.

### Talking about different possibilities

The type systems here are being used both for interpreting the current dialogue state, and for the agent's wider knowledge base about hypothetical, counterfactual, and fictional scenarios. Ultimately these are the same thing: each representation is relative to a particular agent, not absolute, and the type system used for the judgements of the dialogue state is just one among the many. However, to include content about other possibilities, e.g. propositions about counterfactual scenarios, we need to cross-reference other possibilities in the system.

Following Cooper (*Type theory and language: From perception to linguistic communication*) I will use  $\mathbb{T}$  to refer to a modal type system. Within an agent's modal type system  $\mathbb{T}$ , let a possibility  $p_e$  be the default possibility of evaluation, used in perception and information state representation.

Using  $p_e$  as our default, the judgements for the record type in (176a) can be more explicitly described as (176b), where the judgements in the two fields  $x$  and  $c$  are according to possibility  $p_e$ .

$$(176) \quad \begin{array}{l} \text{a. } \left[ \begin{array}{l} x : \text{IND} \\ c : \text{dog}(x) \end{array} \right] \\ \text{b. } \left[ \begin{array}{l} x :_{p_e} \text{IND} \\ c :_{p_e} \text{dog}(x) \end{array} \right] \end{array}$$

The potential to reference other possibilities means that while most fields are typed according to  $p_e$ , there may be others typed according to other possibilities, say in this case  $p_1$ :

$$(177) \quad \left[ \begin{array}{l} x :_{p_e} \text{IND} \\ c :_{p_e} \text{dog}(x) \\ y :_{p_1} \text{IND} \\ c :_{p_1} \text{cat}(y) \end{array} \right]$$

In the case of cross-possibility referencing, 'mixed' record types like the above can be treated as adjoining sets, with a few extra constraints for managing cross-field referencing. The witnessing condition for mixed record types is given in (178):

$$(178) \quad \text{For a mixed record type } RT = \left[ \begin{array}{l} a :_{p_1} T_1 \\ b :_{p_2} T_2 \end{array} \right], p_1 \neq p_2 \text{ and record } r = \left[ \begin{array}{l} a = v_1 \\ b = v_2 \end{array} \right],$$

where  $T_1 \in \text{Type}_{p_1}$  and  $T_2 \in \text{Type}_{p_2}$ ,

$r \in M_{p_x}(RT)$  for any  $p_x \in \mathbb{T}$  if  $v_1 \in M_{p_1}(T_1)$  and  $v_2 \in M_{p_2}(T_2)$ .

That is, if  $[a = v_1] :_{p_1} [a :_{p_1} T_1]$  and  $[b = v_2] :_{p_2} [b :_{p_2} T_2]$ ,  
 then for any  $p_x \in \mathbb{T}$ ,  $[a = v_1] :_{p_x} [a :_{p_1} T_1]$   
 $[b = v_2] :_{p_x} [b :_{p_2} T_2]$

Fields explicitly tied to a specific possibility in  $\mathbb{T}$  can be evaluated relative to that possibility in any other  $p \in \mathbb{T}$ .

Where before we have written propositions as in (179a), we can now write them with explicit reference tying them to possibility  $p_e$  as in (179b)

(179) a.  $\left[ \begin{array}{l} \text{sit} \quad : \text{Rec} \\ \text{sit-type} : \text{RecType} \end{array} \right]$   
 b.  $\left[ \begin{array}{l} \text{sit} \quad :_{p_e} \text{Rec} \\ \text{sit-type} :_{p_e} \text{RecType} \end{array} \right]$

The representation of propositions we have been using depends on checking a situation against a situation type, but has not indicated explicitly the possibility that should be used for this evaluation. In case of divergence, evaluation of propositions should be tied to the possibility which specifies the situation type.

(180) *Proposition truth evaluation:*

For proposition  $p : \left[ \begin{array}{l} \text{sit} \quad :_{p_1} \text{Rec} \\ \text{sit-type} :_{p_2} \text{RecType} \end{array} \right]$   
 TrueProp(p) iff  $p.\text{sit} :_{p_2} p.\text{sit-type}$ , where  $p_2 \in \mathbb{T}$ .

It will also be useful to have a shorthand for specifying that all the fields of a record type are relative (or have been made relative) to a specific possibility. Such a shorthand is given in (181):

(181) For a record type  $\alpha = \left[ \begin{array}{l} l_0 \quad : T_0 \\ \vdots \\ l_n \quad : T_n \end{array} \right]$ , let  $\alpha_{p_x}$  indicate  $\alpha = \left[ \begin{array}{l} l_0 \quad :_{p_x} T_0 \\ \vdots \\ l_n \quad :_{p_x} T_n \end{array} \right]$

Possibilities are distinguished by the types they contain, and the models assigning entities to those types. When a new type is learned or a new member of some type identified, then, it is not necessarily that a possibility  $p_x \in \mathbb{T}$  itself is altered, as a new possibility is identified as  $p_x$ , which expands on the previous  $p_x$ . With this in mind, rather than  $p_{0\dots n}$  referring consistently to specific members of  $\mathbb{T}$ , the index  $p_{0\dots n}$  may be updated to refer to a possibility in  $\mathbb{T}$  containing this additional type or expansion relative to its prior referent. However, in practice the update can just be thought of as updating the content of a single possibility  $p_0$ .

The dialogue gameboard can also be expanded with a field for possibilities that have been introduced for discussion in the conversation. Multiple possibilities can be discussed, including conflicting hypothetical possibilities, counterfactual situations, and fully fictional possibilities entirely distinct from the world or reference.

(182)  $\left[ \begin{array}{l} \text{PUD} : \text{POset}(\text{POSS}) \\ \text{Eval} : \text{POSS} \\ c_{\text{default}} : \text{Eval} \in \text{PUD} \end{array} \right]$

While a specific possibility distinguished as *Eval* may be marked as the speaker's reality, other possibilities may still become the topic of discussion for an extended stretch of time.<sup>4</sup>

### 6.4.2 The *if*-clause

With this in mind, let the antecedent *if*-clause (a) introduce a possibility to the context, adding a new body of information for discussion, and (b) set it as the possibility for use in the consequent. Where consequent  $\psi$  would otherwise be relative to *MaxPUD*  $p_x$ , the *if*-clause *if*  $\varphi$  indicates the consequent content should be treated relative to a possibility  $p_i$  induced by invoking  $do(\varphi)$  on  $p_x$ . For an indicative conditional, this is potentially resolvable as the current possibility, and  $p_i$  is a possible extension of  $p_x$ . This also treats *if* as an operator in itself.

Let *if*  $\varphi, \psi$ . be shorthand for a conditional where the consequent clause has content proposition  $\psi$  and the antecedent is formed from *if* and a clause with content proposition  $\varphi$ . Let the current possibility under discussion *MaxPUD* be  $p_e$ . For conditional *if*  $\varphi, \psi$ , let this express proposition  $\psi$  relative to possibility  $p_i$ . Following Stalnaker (1975),  $p_i$  is a possibility compatible with  $p_e$  in which  $\varphi$  is true (in possible world terms, a possibility  $p_i$  in the context set for  $p_e$ ).

(183) For *if*-clause *if*  $\varphi$ , such that  $\varphi : \text{Prop}$ ,  $if(\varphi)(\ )$  is a modifier phrase with content  $if(\varphi)(r : \text{Rec})$ ,

$$\text{where for } r = \left[ \begin{array}{ll} \text{sit} & ;_{p_e} \text{Rec} \\ \text{sit-type} = \psi & ;_{p_e} \text{RType} \end{array} \right]$$

$$\text{then } if(\varphi)(\psi) = \left[ \begin{array}{ll} \text{sit} & ;_{p_i} \text{Rec} \\ \text{sit-type} = \psi & ;_{p_i} \text{RType} \end{array} \right]$$

for possibility  $p_i$  such that  $p_i = do(\varphi, p_e)$  and  $\neg \text{TrueProp}(\neg \varphi_{p_e})$

That is, for *if*-clause *if*  $\varphi$ , it may be combined with a consequent with the result that the consequent content is relative to possibility  $p_i$  rather than the possibility of evaluation  $p_e$ , where  $p_i$  is a possibility in which  $\varphi$  is true, and which is compatible with  $p_e$ . Where this is violated by confirmation of  $\neg \varphi$  in  $p_e$ , there is no possibility which fulfils both requirements. This does not render such content useless:  $p_i$  merely has to be re-established as an alternative (i.e. counterfactual) possibility  $p_j$ , free from the constraint above.

Since  $\varphi$  is an Austinian proposition, it is made up of both a situation and a situation type. The predicate  $do(\varphi)$  then, should not really have a proposition as its argument. Rather than writing  $\varphi.\text{sit-type}$  each time to specify the situation type to be realised, let this shortcut to the situation type be assumed whenever the argument to  $do(\ )$  is a proposition.

<sup>4</sup>*Eval* here is given as reference to a single possibility, but it may be useful for the *Eval* field to be a list of possibilities, with the reality possibility distinguished as *Eval*[ $n - 1$ ]. This may be useful for e.g. distinguishing on one hand modal subordination where the current *MaxPUD* is distinct from the reality possibility, and on the other scenarios where a non-reality possibility is treated as real, without any modal marking identifying it as unreality. Such a case might be an extended stretch of 'playing pretend', where children's interactions make reference to events in the unreal game-world ("He killed me!"), or discussion of fiction, where in-fiction events do not need to be overtly marked as unreal. Alternatively, the general context (preceding *Moves*, current *QUID*) may be enough to make it clear that *MaxPUD*  $\neq$  *Eval* without further marking, rather than considering the lack of marking an 'upgrade' to being a member of *Eval*.

The *if*-clause introduces a possibility into the context based on the possibility of evaluation in which the antecedent not only is true, but enacted as in the causal *do* operator. The consequent is then relative to that body. The content of consequent is effectively as before, but relative to the *do*(antecedent) state.

For what would otherwise be a dialogue move of type R with semantic content  $\psi$ , application of an (indicative) *if*-clause to  $\psi$  updates the dialogue state as follows:

$$(184) \left[ \begin{array}{l} \text{pre :} \left[ \begin{array}{l} \text{PUD} = \{p_e, \dots\} \quad : \text{POSet(Poss)} \\ \text{LatestMove} = \text{R}(\psi) \quad : \text{LocProp} \end{array} \right] \\ \text{effect :} \left[ \begin{array}{l} p_i = \text{do}(\varphi, \text{pre.MaxPUD}) \quad : \text{Poss} \\ c_{\text{indic}} \quad : \neg \text{TrueProp}(\neg \varphi_{\text{pre.MaxPUD}}) \\ \text{PUD} = \{p_i \mid \text{pre.PUD}\} \quad : \text{POSet(Poss)} \\ \text{LatestMove} = \text{R}(\psi_{p_i}) \quad : \text{LocProp} \end{array} \right] \end{array} \right]$$

The antecedent possibility is induced by enacting  $\text{do}(\varphi)$  on the previous active possibility under discussion (i.e. the previous MaxPUD), and is added to PUD. As an indicative conditional, there is an additional constraint  $c_{\text{indic}}$  introduced that  $\neg\varphi$  is not true in the base possibility, i.e. that  $p_i$  is a potential expansion of the base possibility, not a revision. Although  $\varphi$  need not be true in the current possibility, its negation should not be true. These replace the initial constraints for the antecedent-state and its relationship to the current possibility used at the end of the previous chapter (in example (171b) and update (149)).

Noting Huitink's (2008) observation that in #-valued cases we should maintain assertion of a proposition without a truth value, rather than non-assertion of a proposition – this is what should be provided here for the #-valued cases. The *if*-conditional has no effect on the act of assertion, only its content. Even if a given interlocutor finds the content unevaluable, the status of the speaker's act of assertion is unaffected, and the internal structure of the proposition is maintained.

## 6.5 Non-assertoric consequents

In this section, the above approach will be used to walk through examples of *if*-clause uses other than hypothetical conditionals, namely imperatives, questions, and a metalinguistic use.

### 6.5.1 Imperatives

Older approaches to conditionalised imperatives (e.g. Auwera, 1986) fell back on conditioning a directive action, constrained by a view of imperatives and questions as propositions which had non-assertive speech acts done 'to' them. While this no longer a standard view, there is not much cross-over between more complex approaches to non-propositions, and newer work on conditional semantics. In the process of giving imperatives a more serious treatment as their own kind of semantic object, Kaufmann (2011) addresses conditionalised imperatives. Her treatment of imperatives is modal, with the restrictor *if*-clause a natural candidate for their conditionalisation. I will use a different characterisation of imperative content – and not a restrictor based *if*-clause – but the same general principle applies of affecting the semantic content itself, rather

than the nature of a speech act. As with the status of the assertion being unaffected in hypothetical conditionals, so is there a separation of act and content here. The speaker's action is still recognised in the possibility of evaluation, and the command is still made. The content of the command however, pertains to another scenario: one where the antecedent is true.

The content of an imperative is an Outcome. In the previous chapter an Outcome was indicated by a convention  $\varphi$ , but to discuss conditioning an Outcome, we need more detail. The Outcome type was previously introduced in Chapter 2. The structure of an Outcome is similar to a proposition, but with an Irrealis situation type, whereby the time field is unanchored.

$$(185) \quad \begin{array}{l} \text{a. } Outcome =_{def} \left[ \begin{array}{l} \text{sit} : \text{Rec} \\ \text{irr-sit-type} : \text{Irrealis} \end{array} \right] \\ \text{b. } Irrealis =_{def} \left( r : [t : \text{Time}] \right) \text{RType} \\ \text{c. } \left[ \begin{array}{l} \text{sit} \quad \quad \quad :_{p_i} \text{Rec} \\ \text{irr-sit-type} \quad :_{p_i} \left( r : [t :_{p_i} \text{Time}] \right) \text{RType} \end{array} \right] \end{array}$$

This outcome can be fulfilled by a subsequent situation which is as described, but anchored in time.

$$(186) \quad \text{For Outcome } o_1 = \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{irr-sit-type} = p_0 \end{array} \right] : \left[ \begin{array}{l} \text{sit} \quad \quad \quad :_{p_i} \text{Rec} \\ \text{irr-sit-type} \quad :_{p_i} \text{Irrealis} \end{array} \right] \\ \text{Fulfillers} =_{def} \left[ \begin{array}{l} s_1 \quad \quad \quad \quad \quad \quad \quad :_{p_i} \text{Rec} \\ \text{fulfil-time} \quad \quad \quad \quad \quad \quad :_{p_i} \text{TIME} \\ c_1 \quad \quad \quad \quad \quad \quad \quad \quad :_{p_i} \text{anterior}(s_0, s_1) \\ \text{p} = \left[ \begin{array}{l} \text{sit} = s_1 \\ \text{sit-type} = p_0(\text{fulfil-time}) \end{array} \right] :_{p_i} \text{TRUE} \end{array} \right]$$

As a more concrete example, the Outcome in (187a) can be fulfilled by a situation  $s_1$  following the original  $s_0$ , where the addressee leaves.

$$(187) \quad \begin{array}{l} \text{a. "Leave!"} \\ \quad \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{irr-sit-type} = \left( r : [t : \text{TIME}] \right) [c : \text{Leave}(\text{addr}, r.t)] \end{array} \right] \\ \text{b. } \left[ \begin{array}{l} \text{sit} = s_1 \\ \text{sit-type} = [c : \text{Leave}(\text{addr}, t_1)] \end{array} \right] \end{array}$$

In accepting the directive, the addressee accepts a call to realise a situation that will fulfil the Outcome, and adds it to their to-do-list.

For an Outcome specified for a possibility  $p_i$ , it can only be fulfilled by a situation which meets the fulfilment criteria in  $p_i$ , the antecedent possibility. In issuing a directive with a conditionalised imperative clause, the directive action itself is not conditionalised in some way, but rather the content – the same as the proposition in an assertion.

The action of accepting the conditionalised directive  $o_1$  is no different than accepting an unconditionalised directive. The only difference in the accepted TO-DO item itself versus an unconditionalised imperative lies in the internal content of  $o_1$  (and consequently the situations which could fulfil it), which is specified for  $p_i$  rather than  $p_e$ . If the *if*-case is realised,  $p_e$  is confirmed as a more detailed/developed version of  $p_i$ , and fulfilling the TO-DO item becomes feasible. If the *if*-case is falsified,  $p_e$  and  $p_i$  have fundamentally diverged, and the TO-DO item is irrelevant – if it is a one-off instruction, it can be tossed from the TO-DO entirely. In the meantime while the *if*-case is neither confirmed nor denied, the item can be left on the TO-DO list as a contingency pending *if*-case (and so  $p_i$  compatibility) confirmation.

A short example (188a) can be illustrated as follows. In this example, a doctor *Anon 1* is instructing a patient Agnes on whether to use medication or not.

- (188) a. *Anon 1*: So, stick with them, if, if you're having a bad time, use them. If you don't *<pause>* leave them be. (H5V 121-3)
- b. (1) Stick with them; (2) If you're having a bad time, use them; (3) If you don't [have a bad time], leave them be.

It can be broken down into three parts: an unconditionalised directive, and two conditionalised directives. As the first walkthrough, the Outcomes will be glossed with text. The propositions and questions for subsequent subsections will be more explicitly broken down. I will use the addressee Agnes as the point-of-view interlocutor (i.e. these updates represent Agnes' view of the changing dialogue state), and will also assume that she immediately accepts the instructions as she receives them, adding them to her TO-DO list. We will set up her initial representation of the dialogue state as more or less a clean slate, as in Ag-0:

$$(189) \text{ Ag-0} = \left[ \begin{array}{l} \text{spkr} = dr \\ \text{addr} = ag \\ \text{Eval} = p_e \\ \text{Moves} = \langle \rangle \\ \text{To-Do.addr} = [ ] \\ \text{PUD} = \{ p_e \} \end{array} \right]$$

Since this is an extract from the middle of a consultation, plenty of information has been built up about the common ground already. However, it is not included here as it is not especially relevant for the section of interest. Minimal starter states will also be used in the later examples for the same reason.

To begin with, the speaker (the doctor, *Anon 1*) gives the instruction for Agnes to *stick with them*. The text gloss fronted by ! should be read as an outcome based on the text, with the subscript possibility indicating the possibility for use in the judgements, as in (186).

(190) Ag-1 =

$$\left[ \begin{array}{l} \text{spkr} = dr \\ \text{addr} = ag \\ \text{Eval} = p_e \\ \text{LatestMove} = \text{Dir}(\text{spkr}, \text{addr}, !\text{stick-with-them}) \\ \text{To-Do.addr} = [!\text{stick-with-them}_{p_e}] \\ \text{PUD} = \{p_e\} \end{array} \right]$$

This instruction is by default relative to the possibility of evaluation,  $p_e$ . Marking this is usually superfluous, but will be useful for contrast with the *if*-clause-affected outcomes. In accepting the directive, the *Outcome* is added to Agnes' TO-DO list.

Next, the doctor continues with a clarified instruction.

(191) Ag-2 =

$$\left[ \begin{array}{l} \text{spkr} = dr \\ \text{addr} = ag \\ \text{Eval} = p_e \\ p_i = \text{do}(\text{you're-having-a-bad-time}, p_e) \\ c_{\text{indic1}} = \neg \text{TrueProp}(\neg \text{you're-having-a-bad-time}_{p_e}) \\ \text{LatestMove} = \text{Dir}(\text{spkr}, \text{addr}, !\text{use-them}_{p_i}) \\ \text{To-Do.addr} = [!\text{use-them}_{p_i}, !\text{stick-with-them}_{p_e}] \\ \text{PUD} = \{p_e, p_i\} \end{array} \right]$$

By default, *MaxPUD* should revert to *Eval* when the construction is complete rather than assuming modal subordination of further material, although  $p_i$  remains available for reference were this to be taken up. Use of the indicative adds the constraint  $c_{\text{indic1}}$  that the possibility that Agnes will be 'having a bad time' in  $p_e$  has not been ruled out. As a note, the antecedent situation and instruction in this case do need to be interpreted as generic – the instruction is not for a once-off action, and needs to be kept in storage for repeated performance. However, this is a more general matter of identifying whether an instruction is for a single instance, or is repeatable (e.g. *Leave by 8 o'clock* as an instruction for the day, or a general building rule).

In the last instruction, the Doctor addresses the alternative scenario, introducing another possibility to the discussion.



(192) Ag-3 =

$$\left[ \begin{array}{l} \text{spkr} = dr \\ \text{addr} = ag \\ \text{Eval} = p_e \\ p_i = \text{do}(\text{addr-having-a-bad-time}, p_e) \\ c_{\text{indic1}} = \neg \text{TrueProp}(\neg \text{addr-having-a-bad-time}_{p_e}) \\ p_j = \text{do}(\text{addr-doesn't-have-bad-time}, p_e) \\ c_{\text{indic2}} = \neg \text{TrueProp}(\neg \text{addr-doesn't-have-a-bad-time}_{p_e}) \\ \text{LatestMove} = \text{Dir}(\text{spkr}, \text{addr}, \text{!leave-them-be}_{p_j}) \\ \text{To-Do}_{\text{addr}} = [\text{!leave-them-be}_{p_j}, \text{!use-them}_{p_i}, \text{!stick-with-them}_{p_e}] \\ \text{PUD} = \{p_e, p_i, p_j\} \end{array} \right]$$

In the end, Agnes is left with instructions to stick with the medication in general, but specifically to use them in the scenario where she's having 'a bad time', and to 'leave them be' if she's not.

### 6.5.2 Questions

The result of conditionalising a question is parallel to a proposition or outcome: it is treated in the same way as a bare question, in terms of its relationship to the speaker's dialogue move and what it licenses in the common ground (i.e. an update to QUD), but the typing relates it (and as a result, its answer) to a possibility other than the default.

By demonstrating an example that includes the addressee's response, we can also use this as an opportunity to illustrate building up information about alternative bodies of information, and storing information about possibilities other than the default possibility in the same way.

In example (193a), Kitty debates going to an event that she will have to pay for, and asks Anon 4 whether they will dance with her if she comes.<sup>5</sup> For illustrative purposes we can step through a pared down version of the exchange given in (193b), containing just the question, answer and acknowledgement.

- (193) a. *Kitty*: I'm a student so I haven't got any money. But, judging by how crap the Christmas dinner was ⟨pause⟩ I'm not really particularly tempted, but  
*Anon 4*: Tell him you want to go. That's what we'll do anyway.  
*Kitty*: **Will you dance with me if I come?**  
*Anon 4*: What? Yes.  
*Kitty*: That means I will. ⟨laugh⟩  
*Anon 4*: Yes.  
*Kitty*: Okay. ⟨laugh⟩ (KPK 488–97)
- b. *Kitty*: Will you dance with me if I come?  
*Anon 4*: Yes.  
*Kitty*: Okay.

<sup>5</sup>This question already includes the auxiliary *will*, but for a question without an overt operator to restrict, (e.g. *are you going?*), note that no covert modal would be added in this treatment.

For reference, a minimal description of a linguistic sign for a question *Will you dance with me?* is given in (194), specifying just its contextual parameters for *you* and *me* in *dgb-params*, and its *content*.

$$(194) \left[ \begin{array}{l} \text{dgb-params} : \left[ \begin{array}{l} \text{spkr} : \text{IND} \\ \text{addr} : \text{IND} \end{array} \right] \\ \text{cont} : \left( \left[ \left[ \right] \right) \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \\ [c_1 : \text{dance-with}(\text{dgb-params.addr}, \text{dgb-params.spkr})] \end{array} \right] \right) \end{array} \right]$$

I will use Kitty rather than Anon 4 as the point of view participant, and as before any previous *Moves* and established information in *Facts* are ignored.

$$(195) \text{ K-0} = \left[ \begin{array}{l} \text{spkr} = k \\ \text{addr} = a4 \\ \text{QUD} = \{ \} \\ \text{PUD} = \{ p_e \} \\ \text{Moves} = \langle \rangle \\ \text{Facts} = \{ \} \end{array} \right]$$

The first move is Kitty asking her question. The consequent question by itself would induce a couple of changes in the update: an incrementation of the *Moves* made to include the asking of the question, and an update of *QUD*. With the *if*-clause there are further changes: a possibility  $p_i$  based on  $\text{do}(I\text{-come}, p_e)$  is introduced and marked as potentially compatible with possibility of evaluation  $p_e$ , and the content of the question is made relative to  $p_i$ , something reflected in both the content of the move, and the new member of *QUD*.

$$(196) \text{ K-1} = \left[ \begin{array}{l} \text{spkr} = k \\ \text{addr} = a4 \\ \text{utt-time} = \text{timepoint1} \\ p_i = \text{do} \left[ c :_{p_e} \text{come}(\text{dgb.spkr} = k) \right], \text{pre.MaxPUD} = p_e \\ c_{\text{indic}} = \neg \text{TrueProp} \left( \neg \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ c :_{p_e} \text{come}(\text{dgb.spkr} = k) \right] \end{array} \right] \right) \\ \text{Moves} = \left\langle \text{Ask} \left( k, a4, \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ c_1 :_{p_i} \text{dance-with}(\text{dgb.addr} = a4, \text{dgb.spkr} = k) \right] \end{array} \right] \right) \right\rangle \\ \text{QUD} = \left\{ \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ c_1 :_{p_i} \text{dance-with}(\text{dgb.addr} = a4, \text{dgb.spkr} = k) \right] \end{array} \right] \right\} \\ \text{PUD} = \{ p_i, p_e \} \\ \text{Facts} = \{ \} \end{array} \right]$$

The question Kitty asks is about another possibility  $p_i$ , as in the proposition of the assertion, and outcome of the directive. The latest move was an Ask move for a question relative to  $p_i$ , and the current MaxQUD is now a question pertaining to  $p_i$ . If the next move is a question response, there is license to interpret its content as also pertaining to  $p_i$ .

This is followed by Anon 4's answer:

$$(197) \text{ K-2} = \left[ \begin{array}{l} \text{spkr} = a4 \\ \text{addr} = k \\ \text{utt-time} = \text{timepoint2} \\ p_i \\ c_{\text{indic}} \\ \text{Moves} = \left\langle \text{Assert}(a4, k, \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ c_1 :_{p_i} \text{dance-with}(a4, k) \right] \end{array} \right] \right) \right\rangle \\ \quad \quad \quad \text{Ask}(k, a4, \text{will-you-dance-with-me?}_{p_i}) \\ \text{QUD} = \{ \text{will-a4-dance-with-k?}_{p_i} \} \\ \text{PUD} = \{ p_i, p_e \} \\ \text{Facts} = \{ \} \end{array} \right]$$

Anon 4 gives an affirmative answer to Kitty's polar question, with its content interpreted relative to the same possibility  $p_i$ .<sup>6</sup>

In the third move of the pared down exchange, Kitty acknowledges the answer and the content of Anon 4's assertion can be entered into the shared *Facts*. The entry in *Facts* is an 'ordinary' proposition – just one which pertains to the possibility  $p_i$ . Additional partitioning of *Facts* is not necessary to track information about multiple possibilities: it is already encoded via the possibility for the judgements in the proposition's specified situation type. In acknowledging and accepting the answer, her question is confirmed as resolved, and is no longer under discussion.

(198) K-3 =

$$\left[ \begin{array}{l} \text{spkr} = k \\ \text{addr} = a4 \\ p_i \\ c_{\text{indic}} \\ \text{Moves} = \langle \text{Acknowledge}(k, \text{K2.Moves}[0]), \\ \quad \text{Assert}(a4, k, \text{yes}), \\ \quad \text{Ask}(k, a4, \text{will-you-dance-with-me? } p_i) \rangle \\ \text{QUD} = \{ \} \\ \text{PUD} \{ p_e, p_i \} \\ \text{Facts} = \{ a4\text{-will-dance-with-}k_{p_i} \} \end{array} \right]$$

'Speech act' conditionals were discussed in the previous chapter as part of the general discussion about lexical hedge *if*-clauses. Having just illustrated the effect on the content of imperatives and interrogatives, the last subsection will illustrate the distinction with *if*-clause uses where the *if*-clause affects the content, and those where it is interpreted on a higher metalinguistic level.

### 6.5.3 Politeness

The previous two examples were content-based uses, albeit for non-propositional content. This last example deals with a metalinguistic use. As discussed in the previous chapter on varied *if*-clause uses, the speaker's original action still takes place, but a factor influencing whether the addressee will admit it into the discourse as a valid move have been raised. The stakes are not whether the action exists or not, or whether it only exists if the antecedent state is realised: the issue is whether to treat it as a legitimate, felicitous action. This particular example has a propositional, asserted indicative clause consequent (or, 'consequent'), but the same principle applies to politeness uses on other clauses or utterance segments.

The example I will use is given in context in (199a). The section identified in (199b) will be used for the illustration, with the addressee *Anon 1* as the point-of-view interlocutor for the dialogue state.

(199) a. *Anon 2*: [...] that sort of broke the ice it was  
*Anon 1*: ⟨laugh⟩

<sup>6</sup>This assumes the treatment of polar responses 'yes' and 'no' from Ginzburg (2012), where the content of 'yes' is the proposition that were it turned into a polar question, would be the current maximal question under discussion. For a polar question ( $[\ ]q$ ) as the maximal question under discussion, a response of "yes" has the content proposition  $q$ .

Anon 2: it was really amazing,

Anon 1: Mm.

Anon 2: how erm, gonna just because there'd been this, this scaring incident, it made her loosen her tongue and er

Anon 1: Mm.

Anon 2: because **if I might say so disabled people were treated oddly in those days**, they are not er, erm people I think were a bit er diffident about making contact with them [...] (HDM 270–5)

- b. if I might say so disabled people were treated oddly in those days

As before, we start with a minimal initial state.

(200) A1-0 =

$$\left[ \begin{array}{l} \text{spkr} = a2 \\ \text{Pending} = \langle \rangle \\ \text{Moves} = \langle \rangle \\ \text{QUD} = \{ \} \\ \text{PUD} = \{ p_e \} \\ \text{Facts} = \{ \} \end{array} \right]$$

In the previous examples the updates proceeded move by move. This example will be more incremental and below the level of the dialogue move, to better track resolution of the 'consequent'.

Here, we start with just the utterance of the *if*-clause in Pending. For expediency, the elements in *Pending* are described by either their semantic or illocutionary content, rather than the more expanded specification in the previous chapter including constituents, contextual parameters, etc.

$$(201) \text{ A1-1} = \left[ \begin{array}{l} \text{spkr} = a2 \\ \text{Pending} = \langle l_1 = \text{if}(\text{I-might-say-so})() \rangle \\ p_i = \text{do} \left( \begin{array}{l} \left[ \begin{array}{l} x = \text{dgb.spkr} = a2 :_{p_e} \text{IND} \\ p :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right], \text{pre.MaxPUD} = p_e \end{array} \right) \\ c_{\text{indic}} = \neg \text{TrueProp}(\neg \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} x = \text{dgb.spkr} = a2 :_{p_e} \text{IND} \\ p :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right] \end{array} \right]) \\ \text{PUD} = \{ p_e, p_i \} \end{array} \right]$$

The locutionary proposition containing the *if*-clause is not itself identified with an illocutionary proposition, i.e. an assertion, etc., and a consequent argument has not yet been filled. It does however still introduce the possibility  $p_i$  and its potential compatibility with  $p_e$ . This is partly underspecified, pending resolution of the propositional anaphor *so*. Details for this resolution belong in a lexical entry containing the contextual requirements for *so*: here we are following updates to the common ground, and should just keep in mind that for *so* to be satisfied, the field  $p$  will need to be identified with some contextual proposition.

$p_i$  is available for reference and included in *PUD*, is not upgraded to the maximal possibility under discussion, on grounds of the *if*-clause's metalinguistic content (*say so*). A1 could *also* have initially interpreted the *if*-clause as the antecedent of a hypothetical *if*-conditional, where it would interact with the content, temporarily making  $p_i$  the maximal possibility under discussion. In that case, the proposition *disabled people were treated oddly in those days* would be set as the consequent argument in the same way as the outcome and question in the *Agnes* and *Kitty* examples, and revised once the *if*-clause was reinterpreted as a metalinguistic comment. However, since this process would mainly involve working through a revision, here I assume that, based on the content of the *if*-clause, they get the metalinguistic interpretation right from the get-go.

In A1-2, the utterance continues with *disabled people were treated oddly in those days*, which is added to *Pending* as an independent assertion. In future we will reference it as  $l_2$ .

$$(202) \text{ A1-2} = \left[ \begin{array}{l} \text{spkr} = a2 \\ \text{utt-time} = \text{timepoint1} \\ \text{Pending} = \langle \text{if}(\text{I-might-say-so}) \rangle ( \text{ , } \\ \quad l_2 = \text{Assert}(a2, \\ \quad \quad \left[ \begin{array}{l} \text{sit} = s_2 \\ \text{sit-type} = \\ \quad \left[ \begin{array}{l} \text{q-params} : \left[ \begin{array}{l} s :_{p_e} \text{Set}(\text{IND}) \\ r :_{p_e} \text{disabled}'(s) \end{array} \right] \\ t :_{p_e} \text{TIME} \\ c_1 :_{p_e} \text{posterior}(\text{dgb.utt-time} = \text{timepoint1}, t) \\ c_2 :_{p_e} \text{treated-oddly}(\text{q-params}.s) \end{array} \right] \rangle \rangle \end{array} \right) \\ p_i = \text{do} \left( \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right], p_e \right) \\ c_{\text{indic}} = \neg \text{TrueProp} \left( \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right] \right] \right) \\ \text{PUD} = \{ p_e, p_i \} \end{array} \right]$$

The resolution of discourse anaphora is loosely taken from Ginzburg (2012), whereby a referent should be found in an active *Move*, with an active move being any current member of *Pending*, or a member of *Moves* with content relevant to a question under discussion.

With the addition of  $l_2$  to *Pending* then, its propositional content<sup>7</sup> is a candidate

<sup>7</sup>In (203) this would be more properly written as  $l_2.\text{cont}.a$ : where the content of  $l_2$  is an illocutionary proposition  $\text{Assert}(a2, \text{disabled-people-were-treated-oddly-in-those-days})$ , the proposition *disabled-people-were-treated-oddly-in-those-days* is found at the path  $l_2.\text{cont}.a$  in the locutionary proposition. See the Background chapter for the treatment and structure of locutionary and illocutionary propositions in KoS.

for the resolution of  $p$ . Hereafter this proposition will not only be glossed as *disabled-people-were-treated-oddly-in-those-days*, but the gloss itself reduced to the acronym *DPW-TOITD* for the sake of space. Per discussion of higher-level discourse features in the previous chapter, through a combination of the explicit mention of the speaker's speech action in the *if*-clause, and an adjacent utterance  $l_2$  by the speaker providing a possible candidate for resolving *so*, the *if*-clause should be licensed for interpretation as metalinguistic, and as relating to the acceptability of the proposition expressed by  $l_2$ .

$$(203) \text{ A1-3} = \left[ \begin{array}{l} \text{spkr} = a2 \\ \text{Pending} = \langle \text{if}(\text{I-might-say-so}) \left( \left[ \begin{array}{l} \text{sit} = s_3 \\ \text{sit-type} = [c :_{p_i} \text{acceptable}(l_2.\text{cont.a})] \end{array} \right] \right) \right. \\ \quad \left. l_2 = \text{Assert}(a2, \left[ \begin{array}{l} \text{sit} = s_2 \\ \text{sit-type} = \\ \quad \left[ \begin{array}{l} \text{q-params} :_{p_e} \left[ \begin{array}{l} s :_{p_e} \text{Set(IND)} \\ r :_{p_e} \text{disabled}'(s) \end{array} \right] \\ t :_{p_e} \text{TIME} \\ c_1 :_{p_e} \text{posterior}(\text{dgb.utt-time} = \text{timepoint1}, t) \\ c_2 :_{p_e} \text{treated-oddly}(\text{q-params.s}) \end{array} \right] \end{array} \right] \rangle) \\ \quad p_i = \text{do} \left( \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p = \text{dgb.Pending}.l_2.\text{cont} :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right], p_e \right) \\ \quad c_{\text{indic}} = \neg \text{TrueProp}(\neg \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p = \text{dgb.Pending}.l_2.\text{cont} :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right] \end{array} \right] \rangle) \\ \text{PUD} = \{p_e, p_i\} \end{array} \right]$$

In (204), the locutionary proposition containing the *if*-clause has been resolved, and the agent down-dates it from Pending, adding its content into the Facts of the common ground: that in the possibility where the speaker 'might say so', the content of  $l_2$  is acceptable. The second locutionary proposition  $l_2$  remains in pending, itself unaffected directly by the *if*-clause.

$$(204) \quad A1-4 = \left[ \begin{array}{l} \text{spkr} = a2 \\ \text{Pending} = \langle l_2 = \text{Assert}(a2, DPWTOITD) \rangle \\ p_i = \text{do} \left( \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p = DPWTOITD :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right], p_e \right) \\ c_{\text{indic}} = \neg \text{TrueProp} \left( \neg \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p = DPWTOITD :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right] \end{array} \right] \right) \\ \text{Facts} = \left\{ \left[ \begin{array}{l} \text{sit} = s_3 \\ \text{sit-type} = \\ \left[ c :_{p_i} \text{acceptable}(DPWTOITD) \right] \end{array} \right] \right\} \\ \text{PUD} = \{ p_e, p_i \} \end{array} \right]$$

Finally, *Anon 1* may identify  $l_2$  as being fully parsed and understood, downdating it from *Pending*, and updating *Moves*. In A1-4, it is also assumed that *Anon 1* accepts the content of this assertion, updating *Facts*. While less obvious in acronym form, the proposition *DPWTOITD* remains relative to  $p_e$  throughout as in the more explicit form used in earlier steps.

$$(205) \quad A1-5 = \left[ \begin{array}{l} \text{spkr} = a2 \\ \text{Pending} = \langle \rangle \\ \text{Moves} = \langle \text{Assert}(a2, DPWTOITD) \rangle \\ p_i = \text{do} \left( \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p = DPWTOITD :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right], p_e \right) \\ c_{\text{indic}} = \neg \text{TrueProp} \left( \neg \left[ \begin{array}{l} \text{sit} = s_0 \\ \text{sit-type} = \left[ \begin{array}{l} x = a2 :_{p_e} \text{IND} \\ p = DPWTOITD :_{p_e} \text{Prop} \\ c_0 :_{p_e} \text{might}(\text{say}(x, p)) \end{array} \right] \end{array} \right] \right) \\ \text{Facts} = \left\{ \left[ \begin{array}{l} \text{sit} = s_3 \\ \text{sit-type} = \\ \left[ c :_{p_i} \text{acceptable}(DPWTOITD) \right] \end{array} \right] \right\} DPWTOITD \\ \text{PUD} = \{ p_e, p_i \} \end{array} \right]$$

In the end, *Anon 1* recognises the assertion of *disabled people were treated oddly in those days* as a dialogue move, while incorporating (a) acceptability of the assertion content in the *if-case* possibility and (b) the content of the assertion, into *Facts*. The propositional content of the assertion and the status of the assertion action itself remain unaffected, but additional metadiscursive information is gained.



Note how for imperatives with an *if*-clause that has a possible politeness interpretation, whichever way the addressee processes it, the same practical effect is arrived at. In one case, the *if*-clause is treated as metalinguistic and the outcome is relative to  $p_e$ : however, the directive may be infelicitous, a condition under which the addressee may refuse to accept it onto their TO-DO: its addition to the TO-DO list means it does not over-step the mark – or that at least the interlocutors are behaving that way. Where the *if*-case holds, the outcome is added to TO-DO. In the other case, the *if*-clause is treated as content-related and the outcome is relative to  $p_i$ , and only actionable where  $p_e$  evolves to be a subtype of  $p_i$ . If the directive is acceptable, then the *if*-case obtains in  $p_e$ , and so the outcome can be fulfilled in  $p_e$ . In both cases, the imperative is only expected to be carried out where the politeness condition holds (or is treated as holding). Likewise for questions with potentially politeness-focused *if*-clauses. If the question garners a non-rejecting response, the addressee appears to have considered the *if*-case to hold, one way or another.

## 6.6 Conclusion

In this chapter, I revisited a number of approaches to conditionals, provided a brief reminder of some less-well-regarded uses of *if*-conditionals we have seen, and then considered some results on speaker evaluation of hypothetical conditionals.

Considering this experimental evidence, and existing analyses, I suggested using an inference-based dynamic variably-strict conditional in a trivalent system, as reflective of behaviours surrounding evaluation of hypothetical conditionals. A non-restrictor-based solution is also most amenable to the wide range of uses available, as it does not require all discourse elements potentially affected to be under an additional operator. Doing so with a rich context that handles heterogeneous elements within a single system allows for a unified approach to less ‘conditional’ uses of the construction.

## Chapter 7

# Conclusion

### 7.1 Conclusion

The aim of this thesis was to address *if*-conditionals from a dialogical perspective. Analyses of conditionals within the main formal semantic tradition have primarily aimed to develop formal accounts of how the truth values of conditionals are calculated, emerging from attempts to find the best fit for modelling a ‘conditional operator’ in natural language. Over time, this developed to non-hypothetical speech-act uses, and non-clausal consequents in adnominal *if*-clauses, as formal semantic endeavour continued to expand beyond its roots in logic. Still, echoes of this past are evident in its focus on clean, encapsulated data, and a streamlined model of context.

By contrast, formal work in a dialogical tradition attempts to capture impact on interaction as a whole, in a strongly contextual approach. This takes a broader perspective on meaning in general, and addresses issues and functions which must be confronted to account for interactive data. Interaction can challenge assumptions which are adequate in more monological work, thus helping to develop a more comprehensive picture.

Following an overview of main theories of conditionals, and consideration of data which goes beyond their current scope, there are three main contributions.

An account was provided to incorporate the argumentative role of conditionals in dialogue, connecting them to a more general account of argument in dialogue on the basis of general inference patterns. Conditionals are identified as introducing argument into the discourse, based on successful recognition based on the content of a conditional and known topoi, or accommodation of a new topos. In doing so, enthymemes and topoi are characterised as minimal networks, relating them to structured knowledge more generally.

Metalinguistic conditionals in dialogue were related to the more general phenomenon of utterance repair. Sub-clausal metalinguistic cases are distinguished from other sub-clausal uses which do operate on a content level, i.e. adnominal *if*-clauses. Additionally drawing on non-formal perspectives on insubordination and functional extension (the phenomenon of ‘subordinate’ clauses being used to operate on higher-level discourse elements), they were analysed as affecting a non-content element. From a dialogical perspective, this is already an action performed by communication management actions, in the same way that corrections and clarification questions address issues licensed in the wake of an utterance.

Finally, I reconsidered the analyses introduced in Chapter 2 with some additional perspective from existing experimental work, and proposed that for dialogue, a dynamic variably strict conditional based on inference may be most suitable. In a richer

agent-oriented treatment of context, the context effect of the antecedent can be applied to the both semantic content and other discourse elements. Its treatment as a true proposition in the discourse is agent-dependent, and although existing variably strict analyses are bivalent, this does not preclude a trivalent analysis where a speaker considers it unevaluable. From a communicative perspective, an assertion of a hypothetical conditional is treated as an assertion about the consequent relative to the antecedent context. Speakers vary in whether or not they commit to a true-false evaluation of conditionals in false-antecedent cases: a dialogical account needs to accommodate agent choice in either direction.

## 7.2 Future Work

There are many immediate avenues for further work.

Most pressingly, the corpus study should be verified through inter-annotator agreement.

When dealing with the argument-introduction role of conditionals, they were identified with enthymematic argument (per Breitholtz, 2020). For more explanatory power, this could be linked to work on discourse relations and resulting constraints on the relation type. With regard to the representation of topoi for dialogue, this could be further detailed to include features reflecting the speaker's commitment to the strength of the pattern and its exception-tolerance, for use in modelling argument more generally. In the current representation, the probability field was token: this should be updated with a more meaningful representation and engagement with probability (or totally qualitative representation).

When dealing with variation in *if*-clauses, adnominal *if*-clauses were simply accepted as dealing with the descriptive content. This is no worse than the existing modal-based analysis, but is still something which is observed rather than explained. In linking lexical-hedge *if*-clauses to higher level discourse elements, more specific lexical and contextual cues should be identified as features for weighting an interpretation at the metalinguistic rather than content level. The use of lexical hedges in general should also be integrated with a treatment of conceptual pacts.

From an experimental perspective on the role of inference, it would be helpful to do a replication study for content-based vs. soritical-based conditionals, in order to rule out variation due to slightly different formulations in the phrasing of the conditionals themselves (one with *then*, one with *so*).

In addition, a general direction for an underlying semantics appropriate for conditionals in dialogue, in tandem with a clear delineation between truth value, content and dialogue move, was identified. This needs to be followed through on, and made more concrete. Although not developed here, the perspective and tools gained here open up the prospect of a wider account, unifying these uses through a formal grammar which interfaces with dialogue context, to provide coverage of the majority of conditional uses.

## Appendix A

# Annotation Guide

### A.1 Procedure

1. Identify the consequent (if present) and annotate *cons type* according to the steps in Section A.3, flagging it as *unclear* if necessary.
  - **cons type:** ind, ind-tag, int, imp, polar, np, adj, adv, other, multi, none
  - **unclear:** yes, —
2. Annotate whether it is a *co-construct* created with another speaker, and the *order* of the *if*-clause relative to an identified consequent.
  - **co-construct:** yes, —
  - **order:** pre, mid, post, unclear, na
3. Annotate the functions of the *if*-clause according to the annotation guide in Section A.2
  - **content:** pinfo, pcrep, pccomm, bkgd, bktriv, pqans, poss, —
  - **meta:** frame, hepis, happ, hlex, —
  - **other:** dir, excl, q, —

## A.2 *If*-Clause Function

### A.2.1 Content provision

In terms of informational content...

The *if*-clause is standalone:

1. Is it the sufficient answer to a polar question?

Y: **pqans**

N:

2. Does it otherwise present a possibility/situation/event?

Y: **poss**<sup>1</sup>

N: —

The *if*-clause is not standalone:

1. Without the *if*-clause, would the utterance give incorrect content, or prevent the addressee from being informed of some 'meaningful' connection? (i.e. is the *if*-clause supplementary (or redundant) information?)

Y:

2. Is the situation/event of the *if*-clause used for direct comment/evaluation?<sup>2</sup>

Y: **pccomm**

N: **precond**

N:

3. Does the *if*-clause supply *additional* detail/information?

Y: **bkgd**

N:

4. Is this because it just repeats/rephrases a recently given precondition?

Y: **pcrep**

N:

5. Is it tautological/trivial?<sup>3</sup>

Y: **pctriv**

N: —

### A.2.2 Metalinguistic effects / Communication management

1. Does the *if*-clause help indicate the (possibly new) topic under discussion or a situation to which other content is relevant, rather than primarily being informative in its own right?

Y:

<sup>1</sup>note that this may be used to encourage listeners to come up with some kind of consequence themselves – but it isn't a precondition for anything given: "I swear to God, if they don't turn that music down...".

<sup>2</sup>expect a referential 'it' or 'that' in the consequent, referring to the *if*-case as a whole

<sup>3</sup>e.g. "if it's gone, it's gone"

2. Can you identify a previous utterance introducing the situation present in the *if*-clause?

Y: **frame-est**

N: **frame-intro**

N:

3. Does the *if*-clause target the correctness/accuracy of a word or phrase?

Y: **hlex**

N:

4. Does the *if*-clause express an issue of having permission to make an utterance, or the appropriateness of an utterance?

Y: **happ**

N:

5. Does the *if*-clause make explicit that the truth of the consequent depends on the correctness of information, memory, reasoning etc?

Y: **hepis**

N: —

### A.2.3 Non-assertive speech acts

1. Does the *if*-clause (indirectly) perform a non-assertive speech act?

Y:

2. A directive?

Y: **dir**

N:

3. A question?

Y: **q**

N:

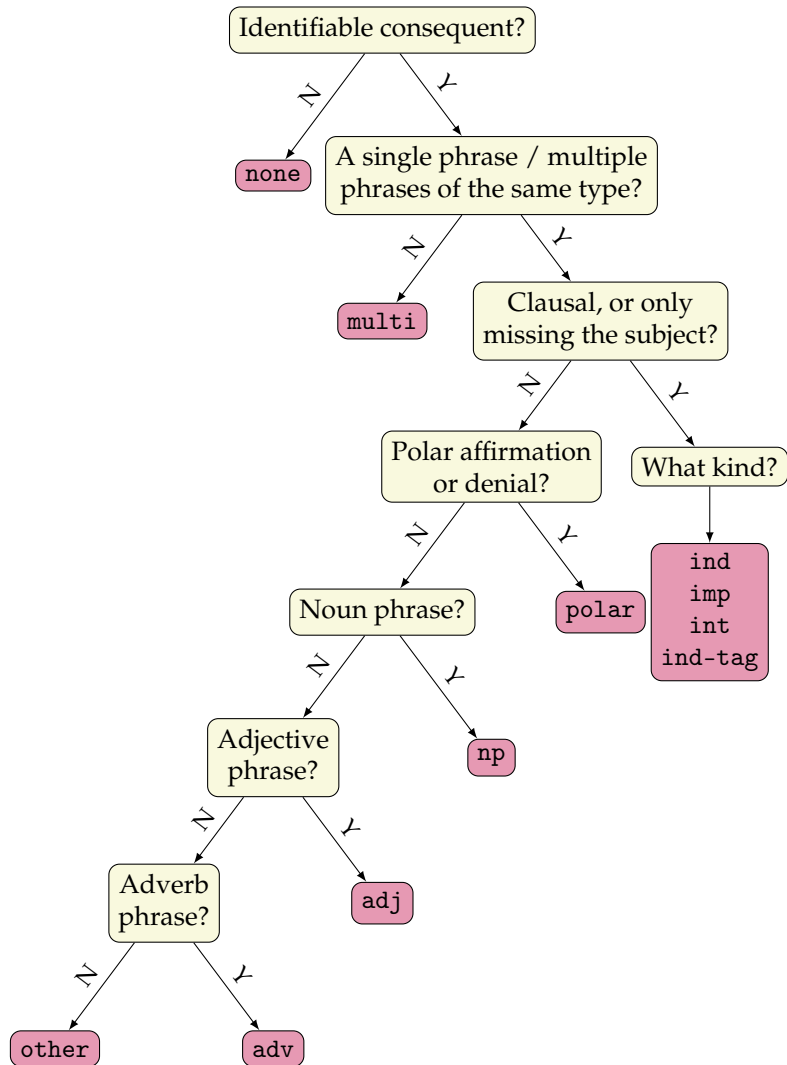
4. An exclamative?

Y: **excl**

N: **other**

N: —

### A.3 Consequent Form



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