TRANSCRIBING SPEECH
errors in corpora and experimental settings

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Transcription of speech

Functional practice and linguistic act

- Contexts
  - Administrations
  - Government organs (parliament)
  - Judiciary courts
  - News reports
  - Podcast transcripts
- Linguistics
  - Ethnography
  - Conversation analysis
  - Corpus linguistics
  - Computational linguistics
- Transcription is a linguistic act itself, governed by its own strategies

What kind of transcription errors?

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Errors and repairs at the basic level of transcription

- Not orthographic or grammatical errors
- Not linguistic annotation errors
- Not non-linguistic events

Errors in the pure identification of the spoken words only: MISTRANSCRIPTIONS

Errors that appear in various phases of the transcription process

- not easily detectable with automatic post-editing procedures

Transcription of speech and errors

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Questions	Transcription process

• What happens when we are involved in a transcription task?
• What kind of errors do we make? Are there any patterns in errors?
• Are there possible explanations for these errors?
• Are these errors predictable? Are they avoidable?
• Can we improve transcription accuracy?
	• Transcription involves
	  ○ Interpretation and choices
	  ○ Selective process
	  ○ Filtering of the transcriber
	• Transcripts containing errors are generally
	  ○ Grammatical
	  ○ Meaningful

Goals

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Psycholinguistic goals

- Errors as evidence of listening and transcribing processes and strategies
- Error patterns based on **meaning** and on **form**
- Similarities and differences in typologies and relative frequencies in experimental and corpus data

Practical goals

- Transcriber's guidelines
  - **Evidence about common errors** made during transcriptions, of their frequency and typology
  - improved planning of **instruction manuals** supplied to transcribers
  - improvement in the **correction and revision phases**

Transcription of spoken Italian

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Corpus investigation ✓

- Variable input
  - Variable sequence lenght
  - Variable nr. of repetitions
  - Indefinite performance lenght
  - Indefinite nr. of transcribers
  - No infos about transcribers and revisors
- Various different settings
- Audio self-administered

Experimental research ✓

- Controlled input
  - Fixed spoken sequence lenght
  - Nr. of repetitions
  - Fixed experiment lenght
  - Given nr. of transcribers
  - Transcriber's infos
- Given setting
- Audio administered by experimenter

Structural Change (1): **SUBSTITUTION**

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An element is switched with another at any linguistic level.

CORPUS DATA

Ex1. "l'attore americano , Tom Cruise , ha presentato , presso un tribunale di Los Angeles l'istanza di separazione dalla moglie Nicole Kidman"

istanza di divorzio > ***istanza di separazione***

"application for divorce" > *"application for separation"*

Ex2. "è opportuno lavare la cassetta una due volte alla settimana utilizzando acqua"

lavare la cassettina > ***lavare la cassetta***

"wash the litter box" (little box in Italian) > *"wash the box"*

EXPERIMENTAL DATA

Ex1 . "e spiega che questo governo ha avviato un grande cambiamento"

un profondo cambiamento > ***un grande cambiamento***

"a deep change" > *"a great change"*

Ex2. "Berlusconi parla ad un congresso di Confindustria"

parla a un convegno di > ***parla a un congresso di***

"talks at a convention" > *"talks at a congress"*

Structural Change (2): **ADDITION**

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An element is inserted into the original sequence of words.

CORPUS DATA

Ex1. "che gli affreschi che erano stati messi sopra, cioè che avevano intonacato"

cioè avevano intonacato > ***cioè che avevano intonacato***

"in other words they plastered" > *"in other words that they plastered"*

Ex2. "che concepì in una idea di governo mondiale i giorni longitudinali, quelli che vanno dal nord al sud"

che vanno > ***quelli che vanno***

"that go" > *"those that go"*

EXPERIMENTAL DATA

Ex1 . "Fermarci ora sarebbe il colpo di grazia per l'economia. Sentiamo ora l'inviato"

sentiamo l'inviato> ***sentiamo ora l'inviato (2)***

"Lets listen to the reporter" > *"lets listen now to the reporter"*

Ex2. "Mi dispiace molto quindi anche lei adesso le ho parlato e le ho chiesto scusa"

ho parlato le ho chiesto> ***ho parlato e le ho chiesto***

"I talked to her I apologized" > *"I talked to her and I apologized"*

Structural Change (3): DELETION

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An element is cancelled from the original sequence of words

CORPUS DATA

Ex1. "e tutte le attrezzature necessarie per panifici pasticcerie gelaterie e pasta fresca"

pasticcerie pizzerie gelaterie> ***pasticcerie gelaterie***

"bakeries, pizzerias, ice cream shops" > "bakeries, ice cream shops"

Ex2. "immagino che voi abbiate vissuto un pizzico di scetticismo"

Immagino che anche voi > ***immagino che voi***

"I imagine that you too have experienced" > "I image that you have experienced"

EXPERIMENTAL DATA

Ex1 . "E un quasi decalogo di consigli pratici è arrivato dal ministero delle attività produttive"

è arrivato anche dal ministero > ***è arrivato dal ministero***

"has arrived also from the ministry" > "has arrived from the ministry""

Ex2. "Ma non erano meglio le caffettiere delle mamme delle nonne* che quando facevano il caffè si sentiva pure al sesto"

Il caffè al primo piano si sentiva > ***il caffe si sentiva***

"when they made coffee on the first floor you could smell it" > "coffee you could smell it"

Structural Change (4): MOVEMENT

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One or more elements misplaced in the order sequence

CORPUS DATA

Ex1. "i Vergine che hanno soprattutto un'attività indipendente sotto questo punto di vista dovrebbero essere soddisfatti"

soprattutto che hanno> ***che hanno soprattutto***

"Virgos especially that have an indipendent activity" > "Virgos that have especially"

Ex2. "provate a scegliere voi quello che vi piace di più"

provate voi a scegliere > ***provate a scegliere voi***

"try yourself to choose" > "try to choose yourself"

EXPERIMENTAL DATA

Ex1 . "Ancora denunce di bottiglie manomesse. Finora otto casi accertati"

Otto casi finora accertati > ***finora otto i casi accertati****

"eight cases until now ascertained" > "until now eight cases ascertained"

Ex2. "Ma non erano meglio le caffettiere delle mamme delle nonne che quando facevano il caffè si sentiva pure al sesto"

delle nonne delle mamme > ***delle mamme delle nonne***

"of grandmothers of mothers" > "of mothers of grandmothers"

CLIPS corpus of spoken Itatalian

Corpora e Lessici di Italiano Parlato e Scritto

- www.clips.unina.it, last accessed 8 July 2007

CLIPS MEDIA subcorpus

- 50% radio broadcasts and 50% television broadcasts
- national and local networks
- sixty minutes of national broadcasts (thirty minutes of radio and thirty of television), and about eighteen minutes for each of the fifteen cities where the recordings took place
  - (Bari, Bergamo, Bologna, Cagliari, Catanzaro, Florence, Genoa, Lecce, Milan, Naples, Palermo, Parma, Perugia, Rome, Venice)
  - **330 minutes** (5.5 hours)

CLIPS media transcripts

Orthographic transcripts have been produced by different transcribers

- (a total of 29 transcribers for the whole 100 hours corpus)
- and subsequently revised by different researchers

A smaller section of the corpus has also been phonetically annotated

- thus leading to a further revision of the full transcripts
- No explicit trace of the number of revisions is given in the public documentation.

CLIPS media errors overview

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Minutes of recordings	**330**
Errors reported	**135**
Avrg. nr. errors per minute	**0.41**

		Frequency	**%**
	Radio	66	**48,9**
	Television	69	**51,1**
	Total	135	**100,0**

l'iscrizione sul ("on") *registro degli indagati*
is transcribed as
> *l'iscrizione nel* ("in") *registro degli indagati*

nei suoi riguardi
is transcribed as
> *nei suoi confronti*.

MEANING PRESERVATION	Frequency	**%**
yes	67	**49,6**
partial	21	**15,6**
no	47	**34,8**
Total	135	**100,0**

Structural change in CLIPS media

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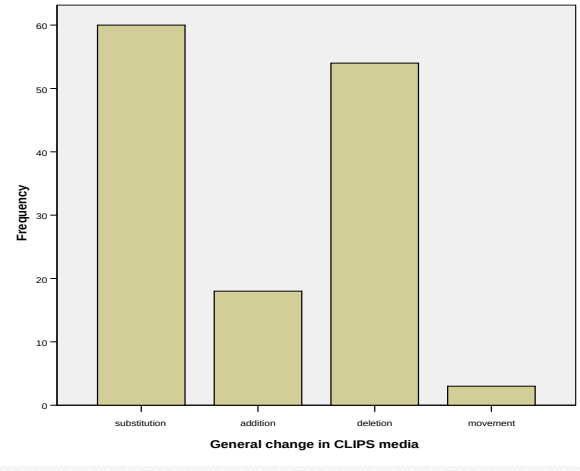
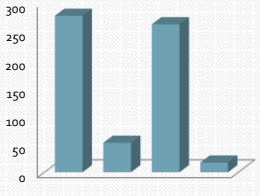


substitution
(60 cases, 44.4%),
deletions
(54 cases, 40%),
addition
(18 cases, 13.3%)
movement
(3 cases, 2.2%)



EXPERIMENTAL METHOD

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Material

- Each participant was submitted to the hearing of 22 different utterances to transcribe
- Two speech typologies
  - A. Controlled speech
  - B. Spontaneous speech

Samples

- Material acquired from tv broadcasts
  - Segmented in turns (utterance turns or dialogue turns)
  - Highest sound quality with least possible noise
  - No superimpositions
- Length varies from around **1.5 sec to 13** seconds.

Tests and participants

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- Test: 22 utterances (2 training, 10 type A, 10 type B)
- 100 different utterances were tested (50 in type A speech and 50 in type B): total 400
- Administration of audio was performed by the experimenter
- Before each utterance, participants were told how many times they were to ear it (one to three times depending of length of sequence).
- Mean length of total experiment: 30 minutes
- Listening material: 2 minutes (1 minute of controlled speech 1 minute of spontaneous speech)

Participants and Test summary

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Participants Nr.	20
Sex	Female: 12 Male: 8
Educ. degree	All attending university
Utterances analyzed	400
Errors reported	**455**
Avrg. nr. errors per participant	22.7
Avrg. nr. Errors per utterance	1.13
Nr errors per minute of listening	**11.38**

Errors overview

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SPEECH TYPOLOGY

	Freq.	%
A. Controlled speech	220	48.4
B. Spontaneous speech	235	51.6
Total	**455**	**100**

MEANING PRESERVATION

	freq	%
Meaning fully preserved	209	45.9
Partially	76	16.7
No meaning preservation (mis-reproduction)	170	37.4
Total	**455**	**100,0**

Structural change in experimental data

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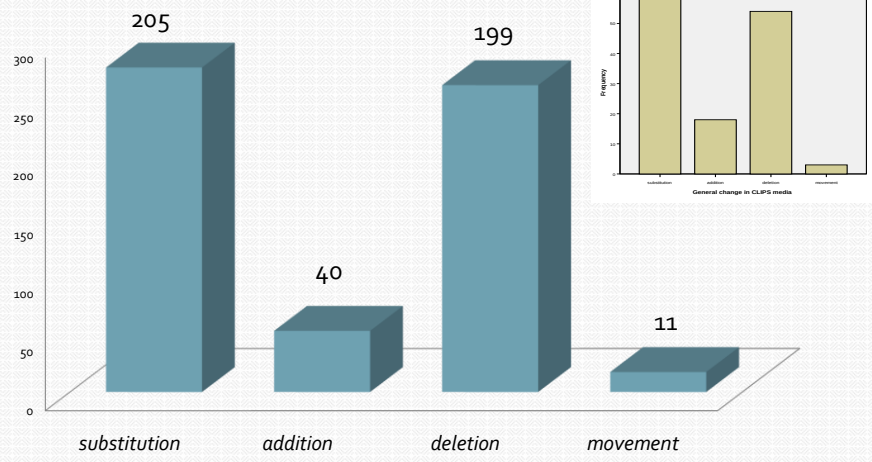

Substitutions

CORPUS: 60 cases 44,4%, EXP: 205 45.1%

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- Most substitutions involve content words
  - 10% function words (19% in experimental data)
  - 10% phonetic variants
- Most involve single words
  - 11.7% involve more than one word
  - 13.3% involve proper nouns
- Most affected grammatical categories are:
  - nouns 21.7%, prepositions 16.3%, proper nouns 15%, verbs 8.3% in corpus data
    - Verbs 3.1%, prepositions 19.0%, pronouns 16.8%, nouns 14.6% in experimental data
  - **Grammatical categories in error corresponds to target**
    - Substitution noun for a noun, etc.

Deletions

CORPUS: 54 cases 40%, EXP: 199 43.7%

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- Deletion involves single words in most cases
  - 20.4% involve more than one word
- Deletions involves
  - 37% function words
  - 5% phatic expressions and 5% repetitions and hesitations
- Most deleted grammatical category at single word level: conjunctions 20.9%, nouns 14% and adverbs 14%
  - In experimental data: adverbs 22.5%, verbs 20%, conjunctions 16.3%

Additions

CORPUS: 18 cases 13.3%, EXP: 40 8.8%

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- Insertion of words always preserves meaning
  - 100% preservation in corpus data
  - 90% in experimental data
- Addition involves 44% function words
- And regards single words in 83.3% of the cases
- Grammatical categories inserted are:
  - 22,2% conjunctions, 11,1% articles, 11,1% pronouns
    - This corresponds to experimental data
    - *e* "and" being the most common insertion

Movement

CORPUS: 3 cases 2.2%, EXP: 11 2.4%

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- Movement is rare both in corpus and experimental data
- It generally does not affect utterance meaning
- It generally involves entire phrases or fragments, rarely single words

Conclusions and questions

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Mis-transcription

- hints on human understanding and **creative repair and filter** in a linguistic re-production task

Repair or editing

- tends to **preserve utterance meaning** (50 to 65% of errors) , but still there is a large amount of misunderstanding in mis-transcription (35-37%)
- Tends to be **meaning-centred**
- produces **grammatical sentences**
- is thus hardly detectable without access to audio
- corpus and experimental data tend to agree in the relative frequencies distribution of structural changes

Conclusions and questions

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Conversion from speech to writing

- more explicit cohesive markers
  - (deletion of repetition, especially those representing hesitation or insertions of the *e* "and" coordination)
- error correction
  - (agreement reconstruction, or the redundant expression *a me mi dispiace* becoming for the transcriber *a me dispiace*)

Weak elements in a spoken discourse

- more often subject to deletion or repair during transcription
  - *anche* ("also") is systematically deleted, conjunction *e* ("and"), *quindi* ("so"), etc.

Guidelines improvement

- planning of instruction guidelines supplied to transcribers (training the ears and training the mind towards formal and superficial linguistic elements)
- improvement in the correction and revision phases during corpus processing and annotation.

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Thanks

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slides soon on: ***WWW.ALPHABIT.NET***

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