Vocabulary for VOCAs
based on a Spoken Language Corpus

12th Biennal International Conference of ISAAC
Communication Bridges, Düsseldorf
Bitte Rydeman 2006-08-01

Project: Words fitly spoken

(SWE: Ord i rättan tid
= words at the right time)

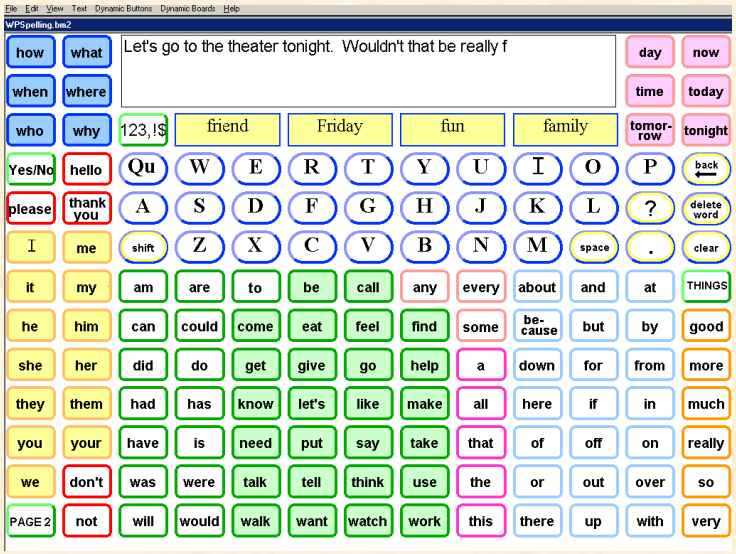
Goal:

- To develop and evaluate vocabualries for VOCAs that can help people with severe speech limitations to communicate more effectively in different activities

Some thoughts about communication

- Communication is usually multimodal – we all use a lot more than speech when we talk to each other: eye gaze, facial expressions, body posture, gestures, refer to things in the environment etc.
- Spoken interaction is jointly produced by the participants
- A VOCA is seldom the only AAC solution for an individual (so it doesn't have to meet all the communicative needs of the user or to be useful in all activities – sometimes low-tech is better)

- With Vocabulary we mean the linguistic content of VOCAs and how it is organised



Current situation in Sweden

- We have access to the latest technologies
- We have the experts and the means to provide assistive technology – but not everywhere – at a local level there is a need for more knowledge about AAC.
- Not all professionals are positive to high-tech solutions.

- Swedish is a small language (appr 9 million)
- Not all international manufacturers of VOCAs support Swedish
- There are very few commercially available vocabularies for VOCAs in Swedish

Why is that a problem?

- It is very time consuming to create vocabularies from scratch for every user and it takes a lot of skill to create a good, functional vocabulary.
- So, what to do?
- Translate English vocabularies that we know of?
- Create new Swedish vocabularies?
- Do we have to chose?
- Why not do both?

Words fiitly spoken – development of funcional vocabularies for VOCAs

The project is funded by the Swedish Inheritance Fund

Project organisation: Furuboda Competence Centre

In collaboration with the Swedish chapter of ISAAC

Partners: DaKo resource centre -County of Halland
DAHJM resource centre – County of Skåne
Department of linguistics, Göteborg University
THF – Organisation for people with Speech limitations

Time: 3 years, September 2005 – August 2008

People employed by the project

- Bitte Rydeman, SLP, PhD student in linguistics, DaKo / Furuboda / Göteborg University
- Therese Knutsson, OT, Furuboda
- Eva Alenbratt, SLP, DAHJM
- PeO Hedvall, engineer, PhD student in rehabilitation technology, Furuboda / Lund University

We are:

- Looking at, evaluating and sometimes translating already existing vocabularies

  (there are very few Swedish vocabularies)

- Creating new vocabularies with words and phrases that can be accessed and used in specific activities.

- We base our vocabularies on a huge database with recordings and transcriptions of spoken Swedish – the Göteborg Spoken Language Corpus

- We test the vocabularies in role play and, at a later stage, in real life

- Eventually our results will be accessible on the Internet at www.isaac-sverige.se

Communicative Goals

- Transactional (ideational)

  Information exchange, oriented towards a result

- Interactional / relational

  social interaction, relations

(Cheepen, 1988; Halliday, 1978; Todman et al 2003)

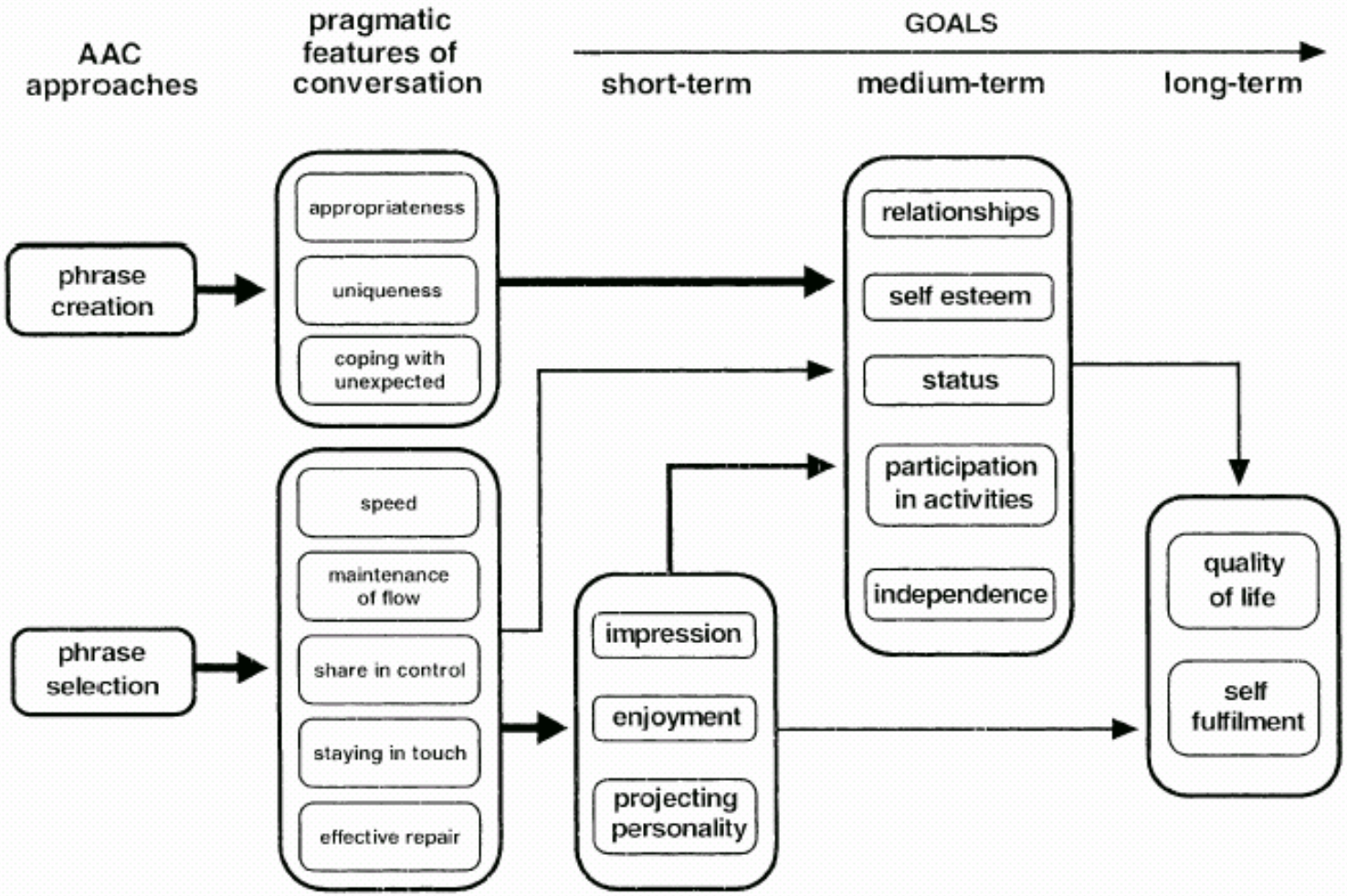
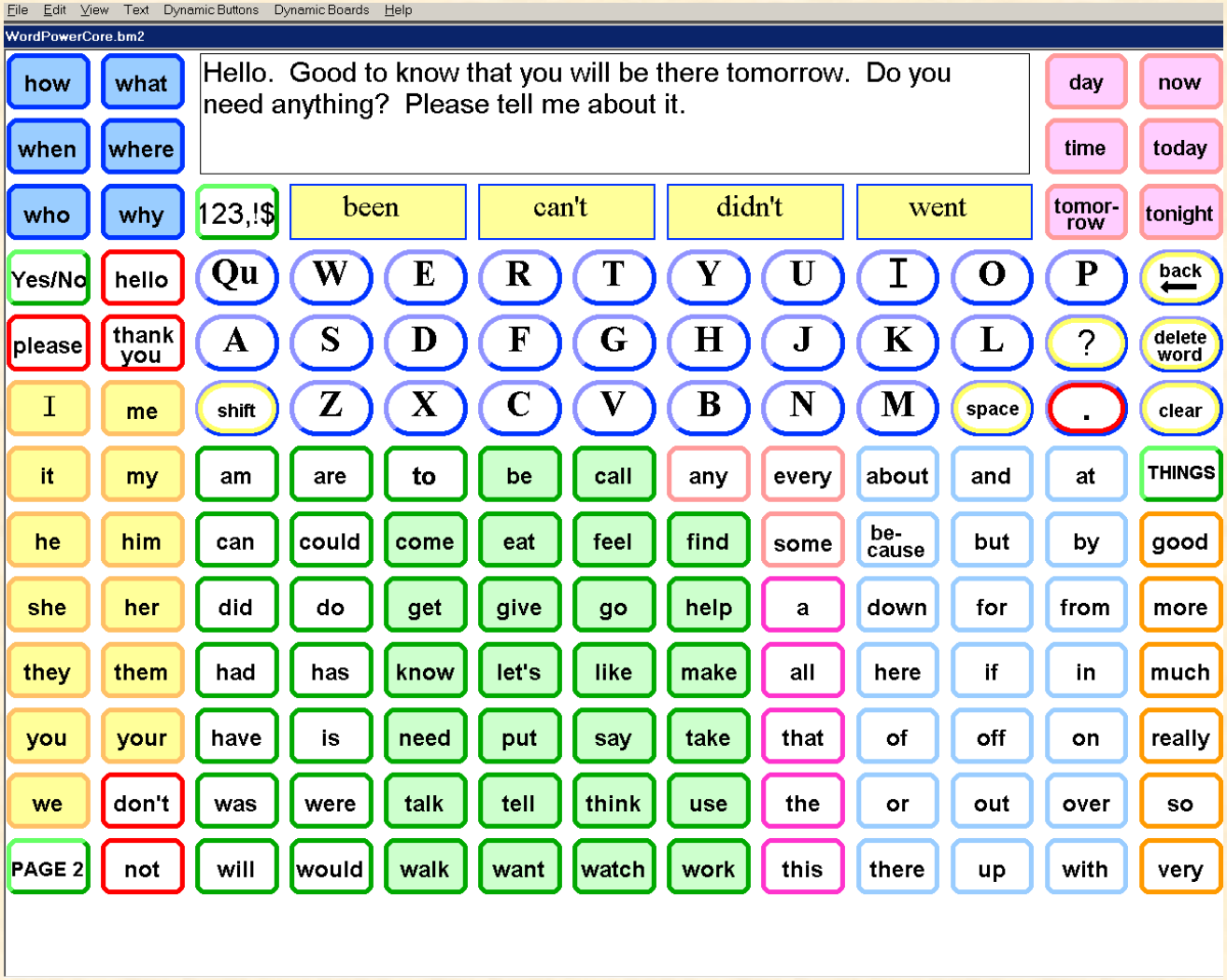


Fig. 1. A model linking assistive device approaches, pragmatic features of conversation, and user goals.

Some VOCAs for dynamic displays

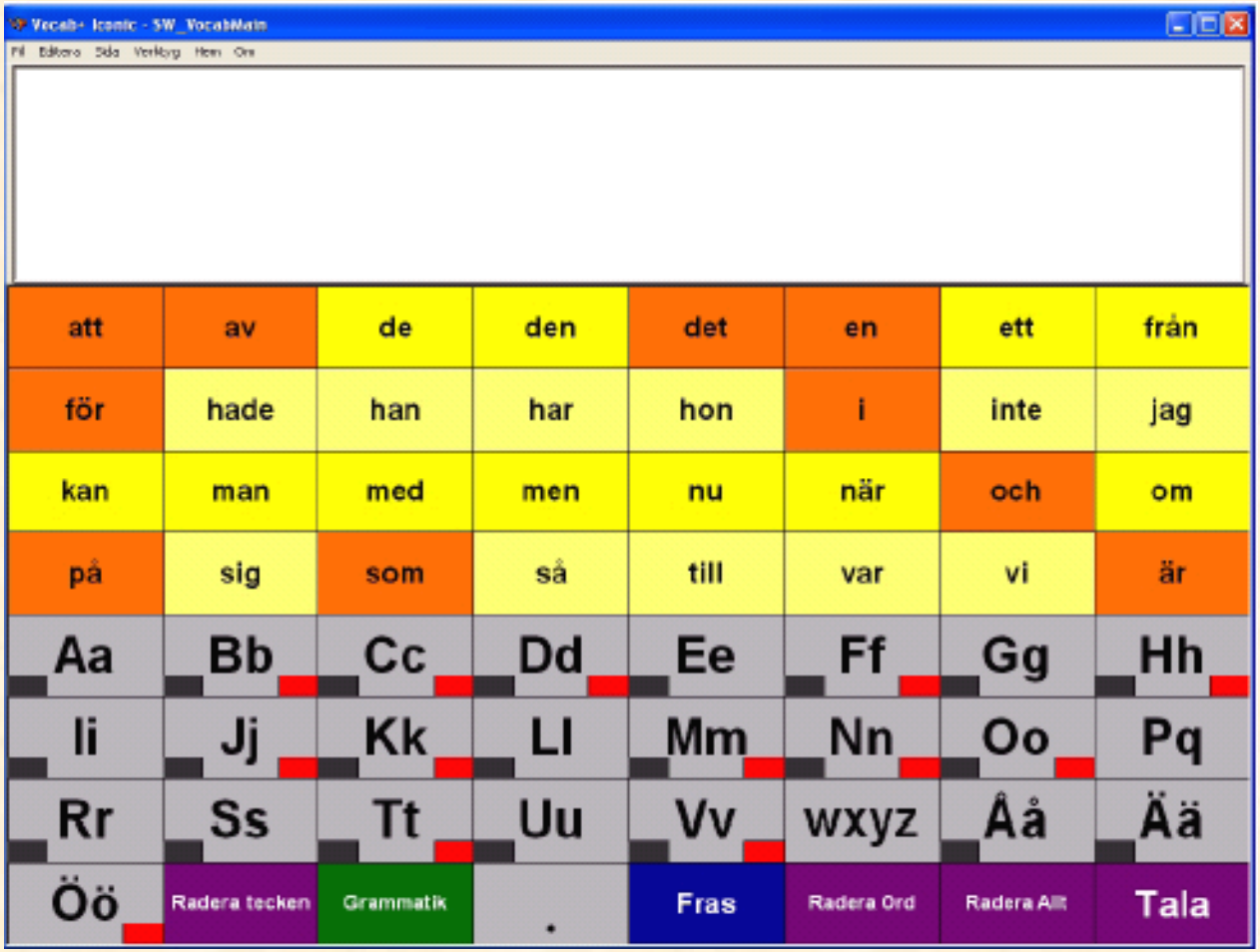


Wordpower

Frequency based "core vocabulary" (+ 100 words)
Alphabetet
Word prediction

"phrase creation"

Vocab Plus

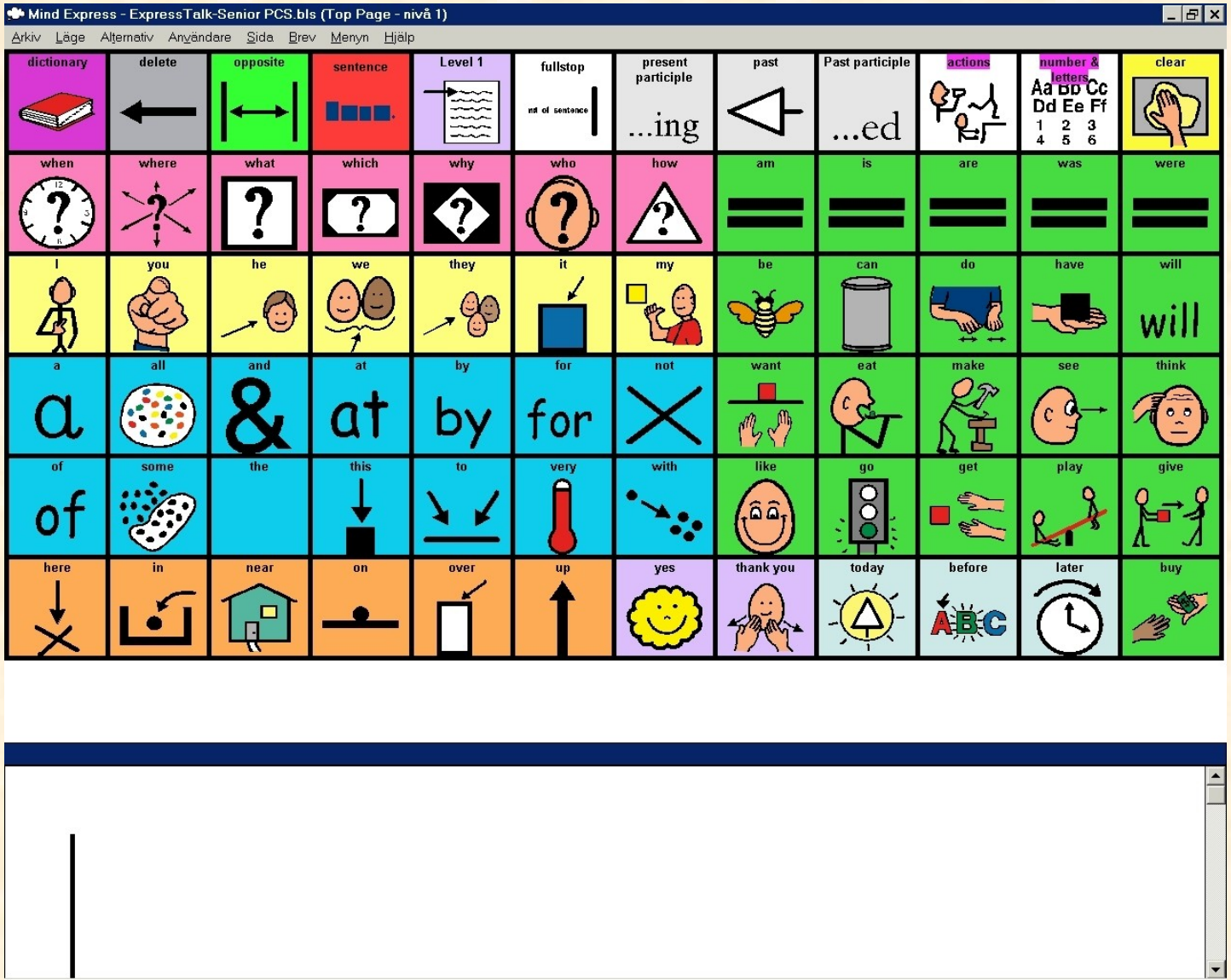


Word based vocabulary

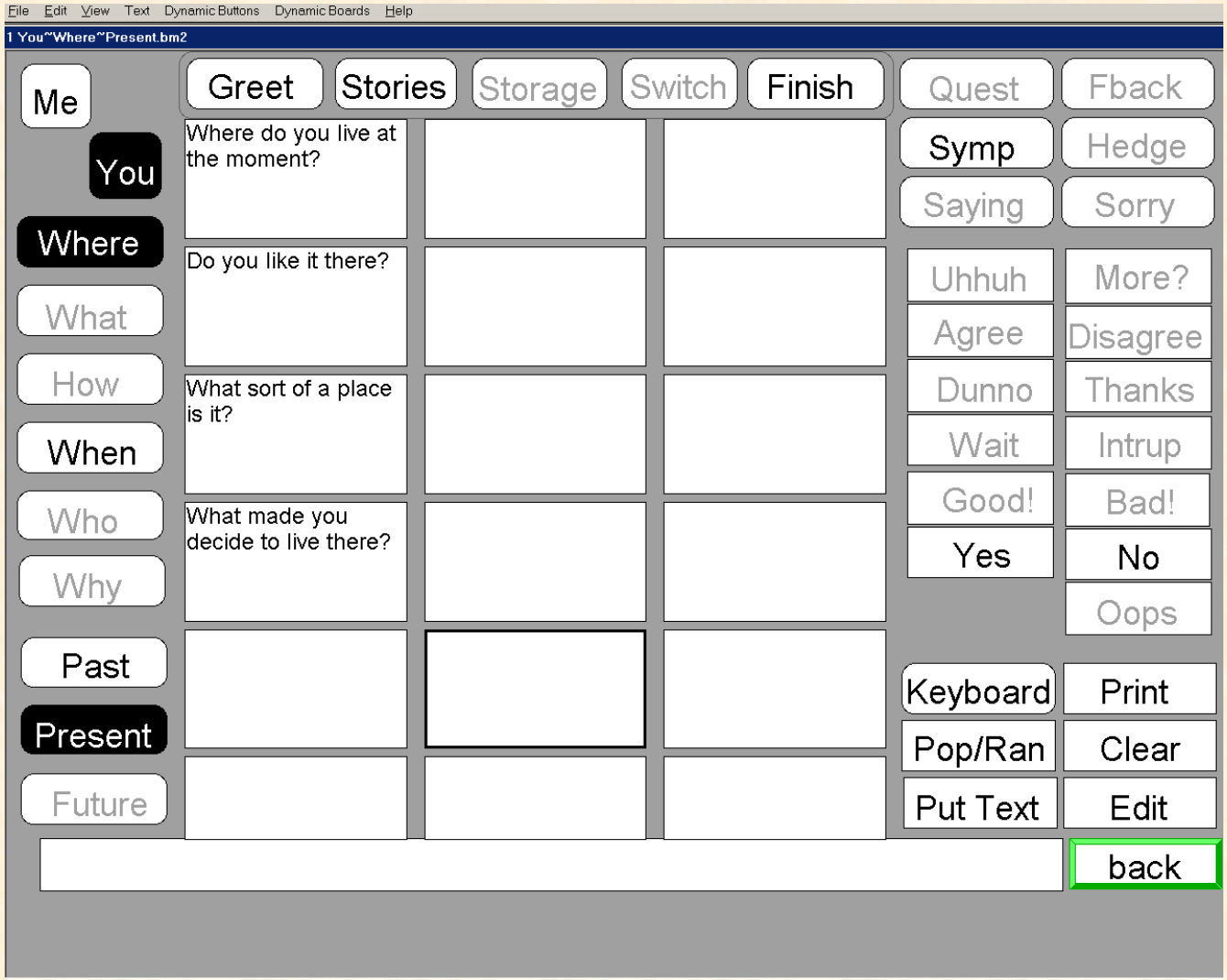
Alphabetet
Word prediction

”phrase creation”
But you can also include phrases and grammar functions

Expresstalk, for Mind Express



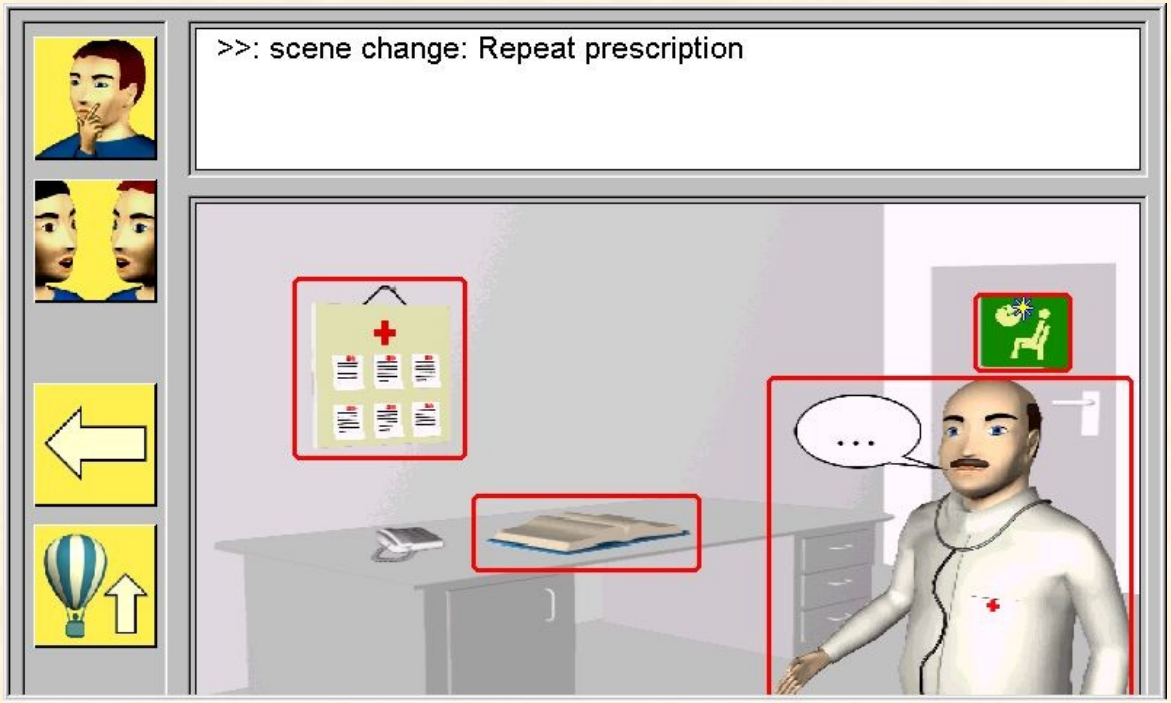
TALK-boards

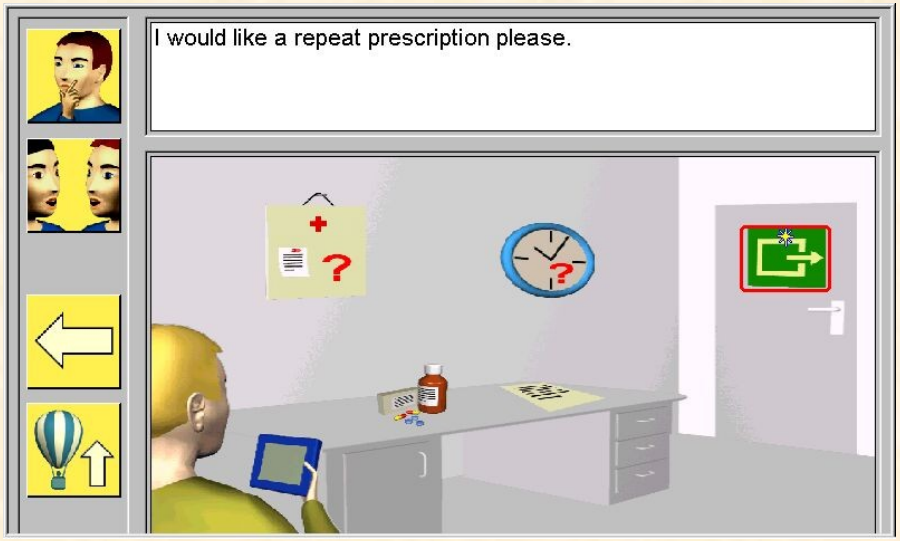


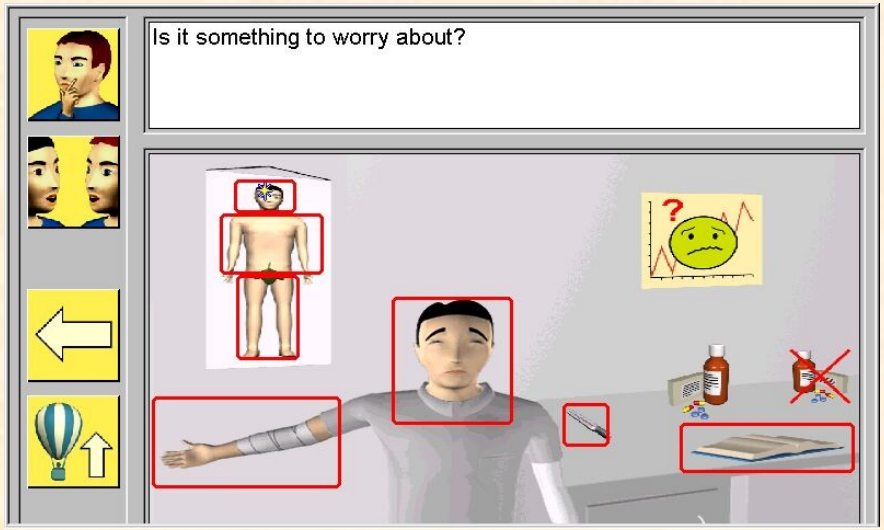
The user prepares his/her own utterances.

”phrase selection”

ScripTalker (no longer available)


>>: scene change: Repeat prescription


I would like a repeat prescription please.


Is it something to worry about?

GSLC - Göteborg Spoken Language Corpus – contains over 1,2 million words

- Is it possible to build functional and effective vocabularies VOCAs, based on the GSLC?
- ScripTalker was built around activities that were chosen by a focus group. It was ment to be used at home, at the doctor's office, in the shop, at the restaurant, for telephone conversations and for discussions.
- In the Frame Talker project they recorded conversations from specific activities to use them as a basis for vocabularies.
- The GSLC corpus contains recordings of conversations in shops, at the doctor's, at the travel agency, on a bus and also some kinds of telephone conversations and informal conversations.

The activity Shop in GSLC

Games shop

- Buy over the counter

Food store

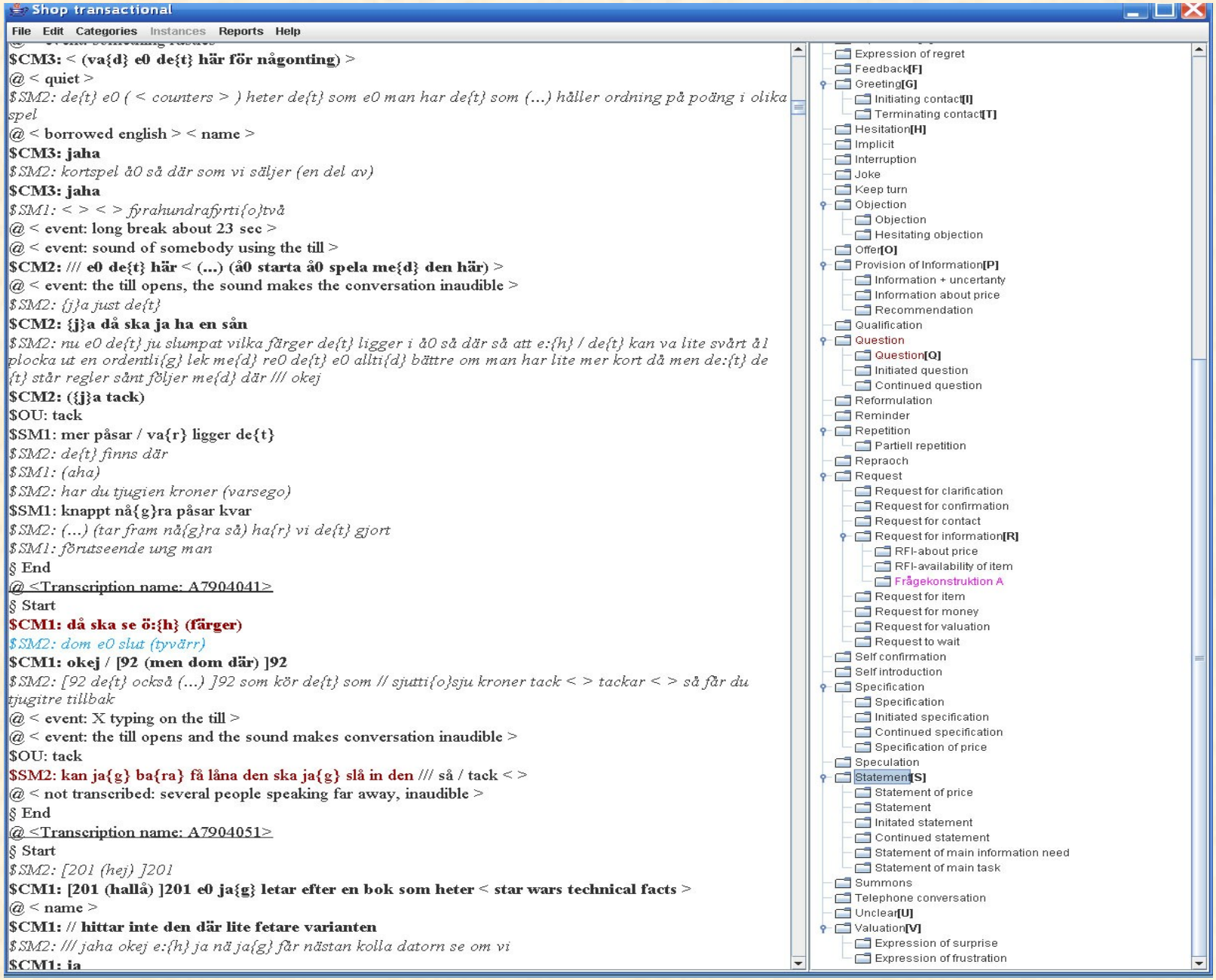
- At the checkout counter where you pay

Activity	*Recordings*	*Speakers*	*Sections*	*Tokens*	*Duration*
Food	6	25.2	49	2 505	1:42:34
Games	43	3.7	93	28 262	4:49:08

Analysis of the shop conversations

- Who is speaking? The customer, the shop assistant or someone else?
- What's it about? Something that has to do with the shopping or something else?
- What do they want to achieve with the utterances?
  (what communicative act / speech act?)
- What are the sub activities?
- What utterances are produced?

Leonardo – a sorting tool



Some ways to request items

Frågesats	Negerad fråga	Topic - comment
$C: har ni (second front) för europa (spelen)	$C: har ni inga icing	$C: den nya: scryon e0 den här
$S: m:	$S: tyvärr / dom kommer den här veckan men de{t} blir nog inga över utan dom flesta går faktis{k}t iväg på postorder	$S: nä den har tatt slut tyvärr den också
$C: ha{r} ru nå{g}ra gamla eliminatorlis:ter	$C: ni har ingen timetwister	$C: hej / e{h} sån här KORTLEK me{d} startrek har ni de{t}
$S: NEJ	$S: nä (...)	$S: m / vill ni ha en start start lek eller ska du ha en sån här
$C: finns / boosters / dom svarta	$C: ni har inga lösa < (marje) > kort	$O: // senaste numret av (...) när / fick (de{t}) / när kom den då / eller har ni den
$S: de:{t} har vi nog nå{g}ra kvar kanske: /// där	$S: jodå	$SM1: // (kommit för nå{g}ra veckor sen) (...)
$C: /// har ni nå{g}ra lösa (medikort) te1 pärmar eller nåt	$C: m* du har ingen ice age	$C: /// e:{h} spelmarker å0 sånt va{r} ha{r} ni de{t}
$S: ja:jamensan	$S: nä dom e0 slut tyvärr	$S: (e:0 de{t} såna du e0 ute efter) (...)
$C: har ni ett schackdator	$C: /// ni har inte (fått) in nåt som heter < centurion > / svenskt	$S: mer påsar / va{r} ligger de{t}
$S: /// inte schackdator därehamot / vi ha{r} program / till vanliga datorer / men inga: schackdatorer å0 så	$S: // jo: / tro{r} inte den görs numer	$S: de{t} finns där
$C: /// har ni nå{g}ra (...) ti{ll} mutant	$C: [1 om]1 ni har inte kommit ut me{d} den nya	
$S: // till mutant // de{t} va{r} en bra fråga (...)	$S: [3 här]3 / här står de{t}	**Indirekt uppmaning/fråga**
$C: hej / (e{h} va) har ni kult		$C: (hallå) e0 ja{g} letar efter en bok som heter star wars technical facts // hittar inte den där lite fetare varianten
$S: {j}a fast dom har tatt slut igen tyvärr		$S: /// jaha okej e:{h} ja nä ja{g} får nästan kolla datorn se om vi

Customers who accept, thank, affirm, confirm and agree

Acceptance + Acknowledgement + Affirmation + Confirmation + Agreement			
ja	**de{t} stämmer**	den (....) ja	den ska ja{g} ha
jaha	**ja{g} vet**	de{t} e0 bra	ja{g} tar den då
jajemen	(j}aa de{t} stämmer		den skulle ja{g} vilja köpa
japp	ja just de{t}		tror ja{g} köper sån hä{r}
jo	{j}a precis	**tack**	man kan nästan tro de{t}
just	**< yes >**	**tackar**	de{t} kan vänta
just de{t}	**nä**	tack ska du ha	de{t} behövs inte
m	**hä**	tack så mycke{t}	ingen fara
mhm	**så**	tack så hems{k}t mycke{t}	(visste väl de{t})
okej	**sådär**	**varsågo{d}**	de{t} e0 tråki{g}t

Frequencies

The 20 most common words in GSLC and in the games shop

	GSLC SST		%		Customers: Spelkund		%		Shop assistants: Spelbiträde		%
1	det	77810	6,16	1	det	(212)	5,71	1	det	(319)	5,86
2	är	36843	2,92	2	ja	(137)	3,69	2	ja	(208)	3,82
3	och	35471	2,81	3	jag	(119)	3,20	3	är	(170)	3,12
4	ja	32404	2,56	4	är	(119)	3,20	4	du	(130)	2,39
5	att	30440	2,41	5	har	(84)	3,26	5	jag	(123)	2,26
6	jag	28628	2,27	6	den	(80)	2,15	6	har	(117)	2,15
7	så	26059	2,06	7	så	(68)	1,83	7	inte	(108)	1,98
8	som	19205	1,52	8	här	(67)	1,80	8	vi	(101)	1,85
9	inte	18691	1,48	9	du	(63)	1,70	9	den	(90)	1,65
10	har	18469	1,46	10	dom	(57)	1,53	10	så	(87)	1,60
11	vi	18421	1,46	11	inte	(57)	1,53	11	dom	(82)	1,51
12	på	17719	1,40	12	m	(51)	1,37	12	och	(74)	1,36
13	man	17377	1,38	13	ni	(50)	1,35	13	en	(70)	1,29
14	då	17343	1,37	14	och	(49)	1,32	14	i	(64)	1,17
15	i	17039	1,37	15	en	(44)	1,12	15	på	(63)	1,16
16	du	16040	1,27	16	för	(43)	1,12	16	ska	(60)	1,10
17	en	15506	1,23	17	då	(41)	1,10	17	här	(59)	1,08
18	ju	15286	1,21	18	kan	(37)	0,97	18	eller	(55)	1,01
19	men	14623	1,16	19	okej	(36)	0,97	19	då	(54)	0,99
20	dom	14534	1,15	20	var	(33)	0,89	20	för	(53)	0,97
	1 263 408		**37,3**		**3715**		**38,9**		**5447**		**38,3**

Frequencies

The 20 most frequently spoken words in GSLC (37,3%):
det är och ja att jag så som inte har vi på man då i du en ju men dom
Attempted translation: *it is and yes that I so as not have we on one then in you a then but they*

The 20 most frequently spoken words by customers in the Games shop (38,9%):
det ja jag är har **den** så **här** du dom inte **m ni** och en **för** då **kan okej var**
Attempted translation:*it yes I is have **it** so **here** you they not **m** **you(plur)** and one **for** then **can okay where***

At the supermarket there were two other words that were extremely frequent:
hej = hello and **tack = thank you**. They were among the 7 most frequently used words that were spoken by the customers, as well as the shop assistants

Phrase structure

before core phrase after

Satsstruktur (påbörjat)

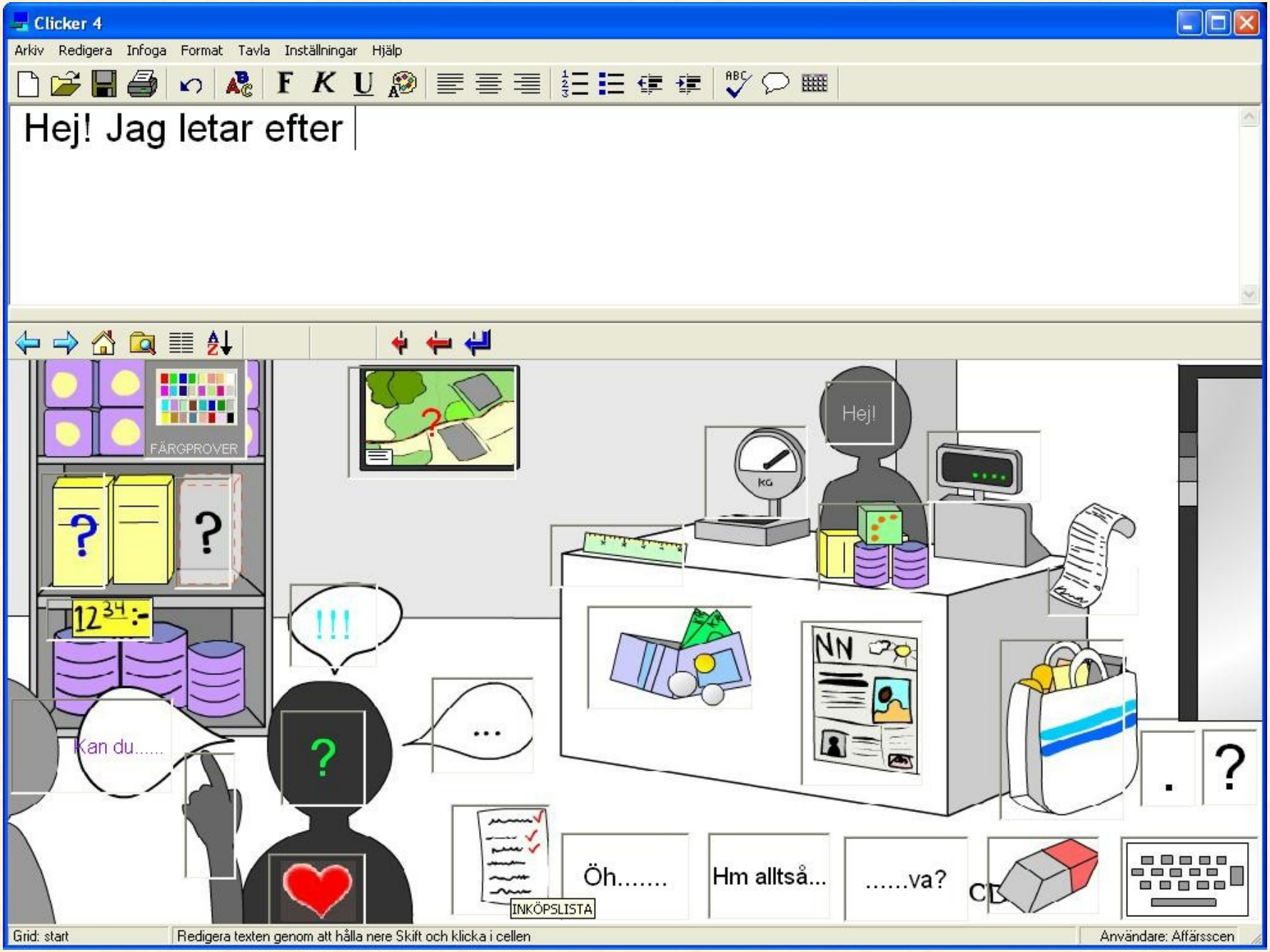
Utvidgad sats										
		Inre sats								
Förfält		*Initialfält*		*Mittfält*			*Slutfält*			*Efterfält*
		inl/subj	alt fun	finit	subjekt	satsadv	infinit	nom.l	advl	
där	(du)	det	var	är	en	inte	ha	det här	ful	så
Eh	eftersom	den	vad	var	ett	ju	få	en sån	gott	va
eller	fatta	jag	när	har	nån	nog	köpa	såna	nya	heller
Hm	förresten	du	vilken	kan	nåt	bara	kolla	pengar	stor	alltså
Ja	jag undrar	ni	varför	får	några	väl	se	priset		eller nåt
jaså	jajemen	dom	hur	ska	ingen	också	veta	kort		kanske
Jo	jaha	det här		vill	inget	här	vänta	väska		i alla fall
M	klart	man		vet		där	beställa			I och för sig
mhm	men			tror		bra	göra			
nej	och			tar		synd			begagnad	
njae	okej			finns		kanske				
Nä	perfekt			går		lite				
nähä	så			kommer		mycket	köpt	spänn		
	sen			säljer		ändå				
	tack			kostar	Prep:					
Oj	tyvärr			räcker	i					

Sub activities used in the VOCA prototype		
Sub activity	**Speech act**	**Expression**
Customer greets ("Hälsa")	Greeting	Hej! Hallå! Hejsan! Tjena!
Customer asks for item ("Fråga efter vara")	Request for item	Har ni _ ? Har ni några _ ? Har n senaste _ ? Ni har ingen/inga _ ? Jag undrar om ni har _ ? _, har ni det? Jag letar efter _ . Då ska vi se, öh, _. Ni har inte fått in nåt som heter __ ?
Customer responds to answer ("Återkoppla" och "Utrop")	R for clarification	Vad sa du? Öh? Va?
	Feedback	Ja. Jaha. M. Okej. Nä. Japp. Javisst. Jadå. (Se tabell AAACA) Det ordnar sig.
	Expression of regret	Tyvärr. Som sagt. Det var ju synd.
	Expr. of frustration	Fan vilken otur! Oj då! å kors! Åh jösses!
Customer asks a follow up question ("Fråga mer")	R for explanation	[Väldigt specifika yttranden]
	R for confirmation	Vill du ha _? _, eller? _, va? Så det är säkert det? Visst har ni ?
	R for information	Du har inte den? Du har inte _? Är det här bra då? Hur många är det i ett sånt här då? Och då gäller inte priserna på dom här då? Hur mycket?

Prototype shop vocabulary

- First prototype of shop vocabulary, created in Clicker 4. Based on the activity Shop in GSLC, the sub activities Games shop (buying,sellling and getting information about games at the counter in a small shop) and Supermarket (at the checkout counter).
- The prototype was also implemented in the Dynamo and a compressed version was implemented in a Nokia mobile phone with Imagetalk.

Main page of the protopype shop vocabulary in Clicker 4


Clicker 4
Arkiv Redigera Infoga Format Tavla Inställningar Hjälp
Hej! Jag letar efter
FÄRGPROVER
Hej!
!!!
Kan du.....
...
INKÖPSLISTA
Öh.....
Hm alltså...
.....va?
Grid: start
Redigera texten genom att hålla nere Skift och klicka i cellen
Användare: Affärsscen

Role play trials with the vocabulary

We created two different "shops" for the activity – a games shop and a food shop

We tried these vocabularies

- Prototype shop vocabulary for Clicker 4
- Prototype shop vocabulary for Dynamo
- Prototype shop vocabulary for Imagetalk
- Speakout VOCA with keyboard and word prediction
- Vocab plus – unedited Swedish version
- TALK boards for Speaking Dynamically – unedited Swedish translation
- Express talk for Mind Express – unedited Swedish translation
- Bliss board – paper version, no speech

Testing the vocabularies

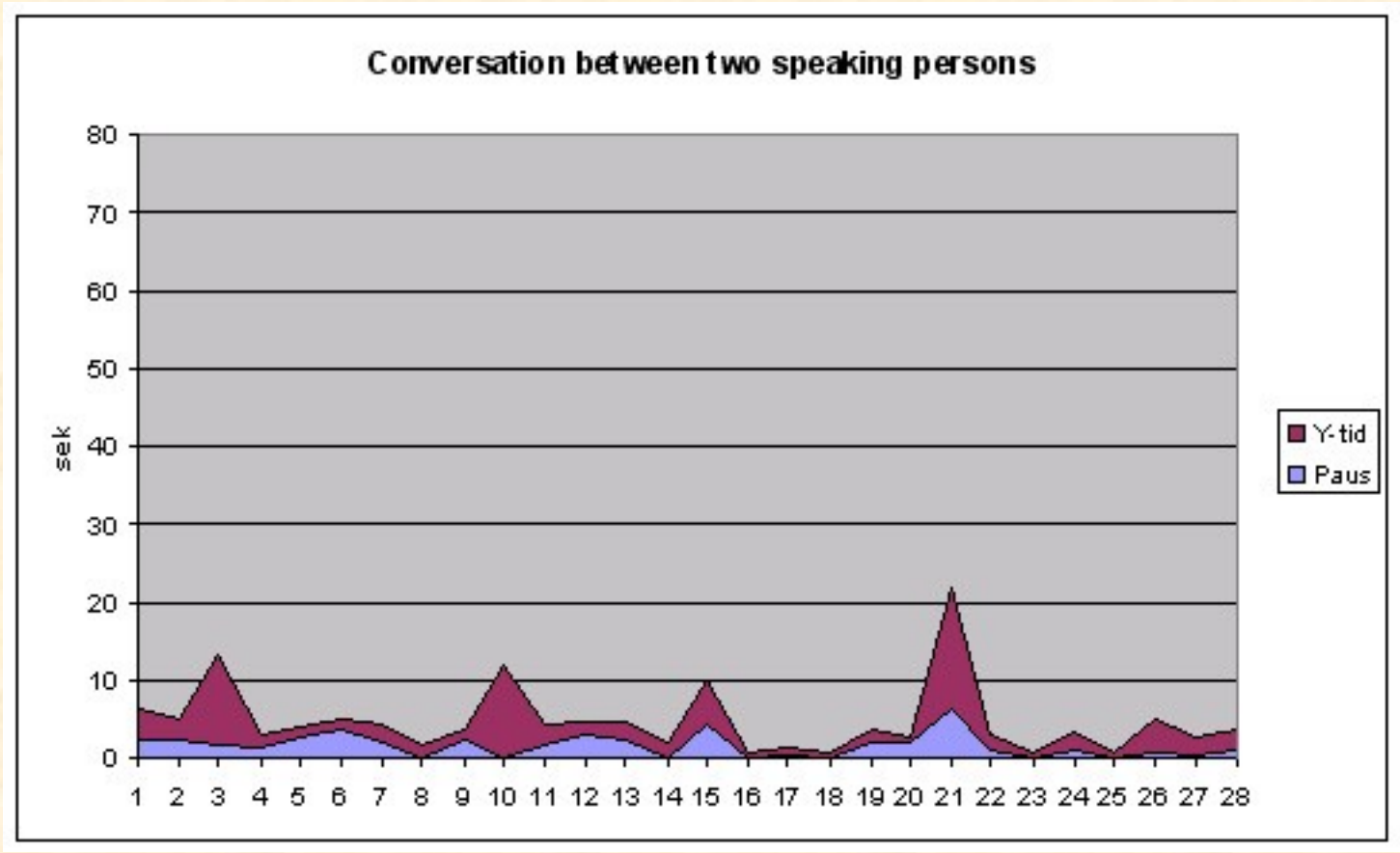
- The vocabularies were tested by otherwise speaking persons that were not previously acquanted with the vocabularies.
- We tried to replicate some of the episodes from the recordings in the corpus and also use some free shopping episodes, where the participants invented the circumstances as they went along.
- The tests were video recorded.

- Some of the conversations have now been analysed
- In some conversations the utterences and the length of pauses between turns have been timed, and the words per utterances have been counted.
- I have also looked at the content of the conversations and some multimodal aspects of using VOCAs

Preliminary results

- The test persons liked the prototype vocabularies and the "speech-like" features of the utterances
- When everything went according to plan, the flow of the conversation was promoted by the pre-stored utterances
- When the prototype users chose the next best utterance when they couldn't find the one they wanted, it could sound strange.
- With the vocabularies where the main idea was to construct novel utterances, the users tended to give more information, but at a slower pace.

Some preliminary graphs
(to be interpreted with caution)

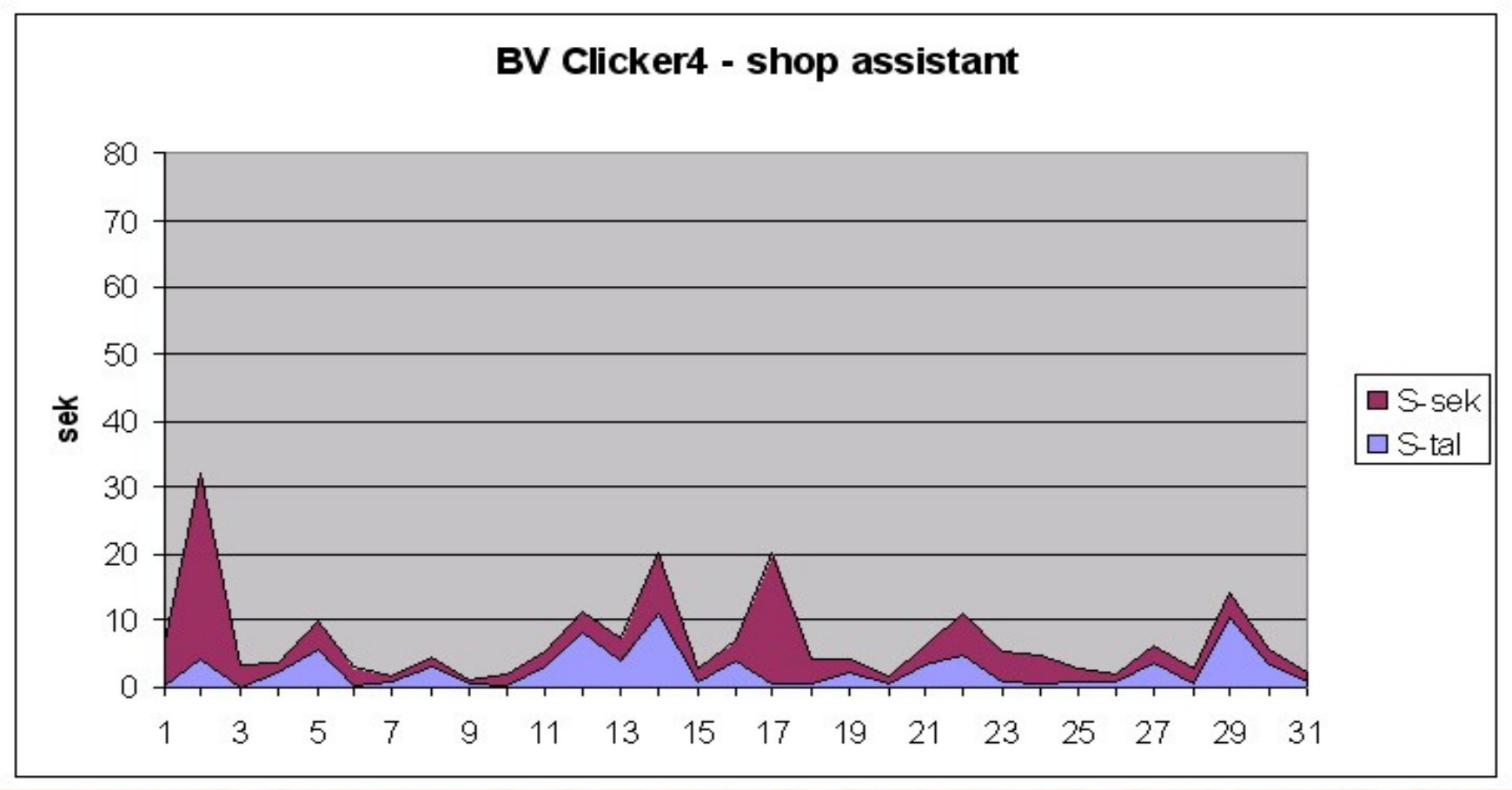


Purple= lengh of utterance

Gray= Pause before utterance

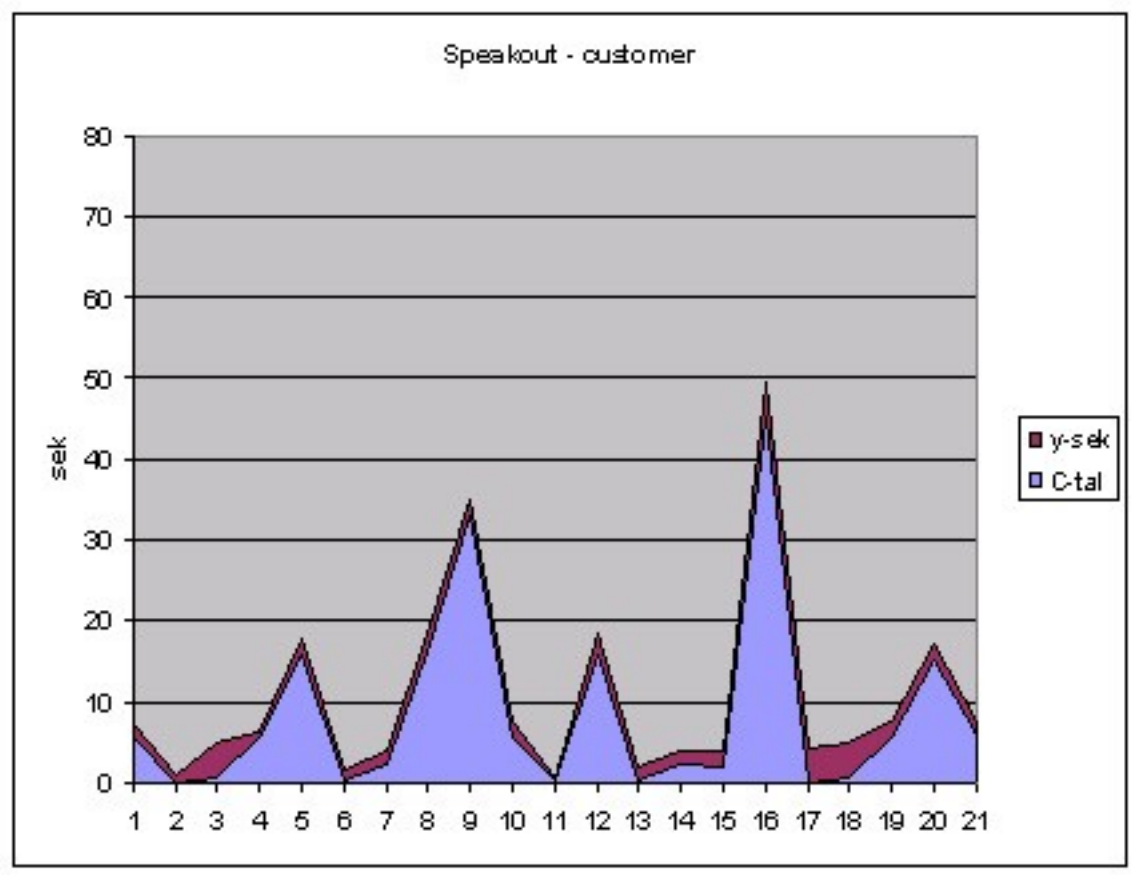
Each graph is from one unique conversation

Utterances by shop assistant



In shop conversations there are natural pauses because of physical things that have to be done.

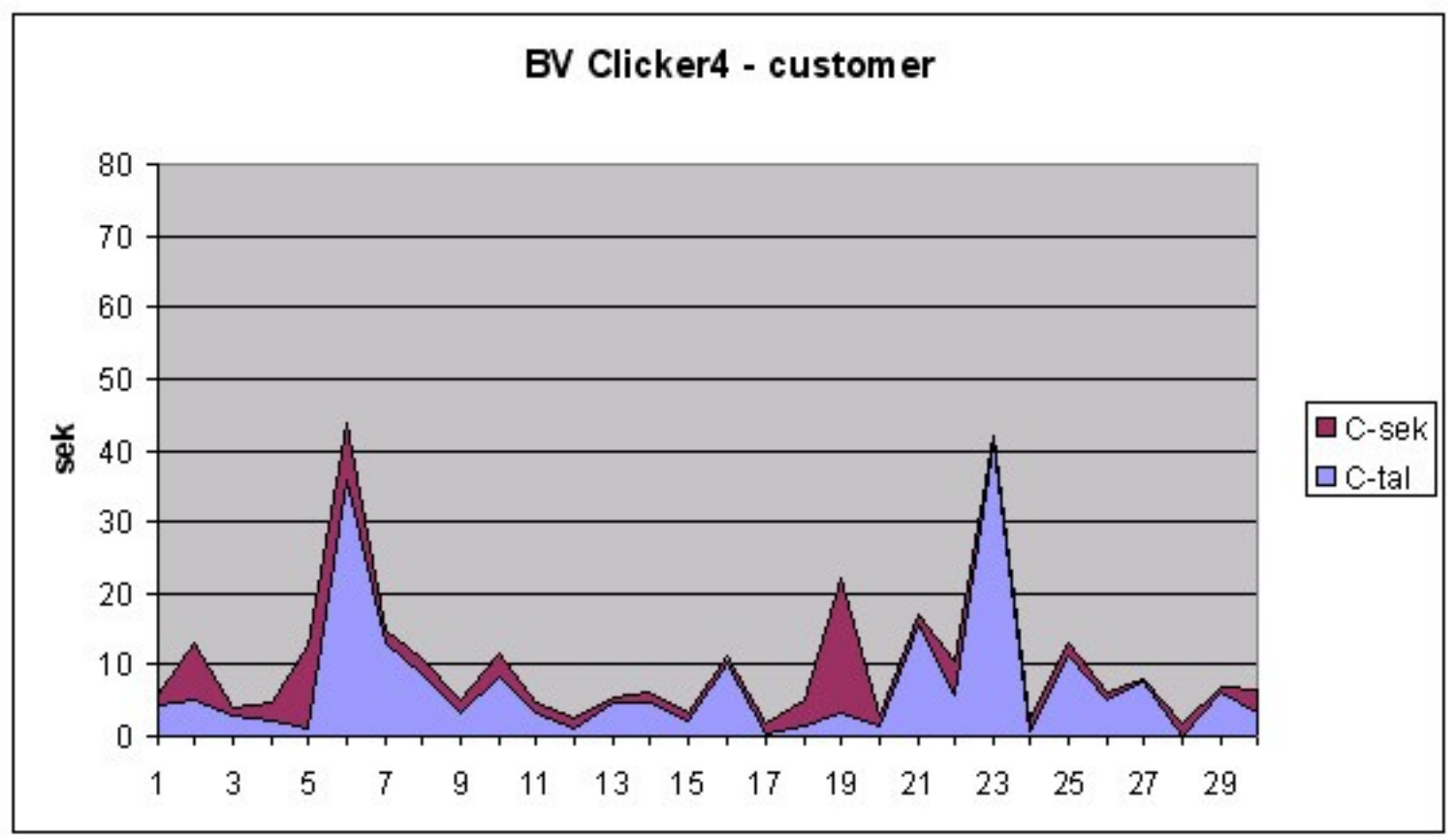
Customer using keyboard based VOCA with word prediction



The device spoke only the finished phrases, not every word when it was typed.
That's why the pauses are so long.

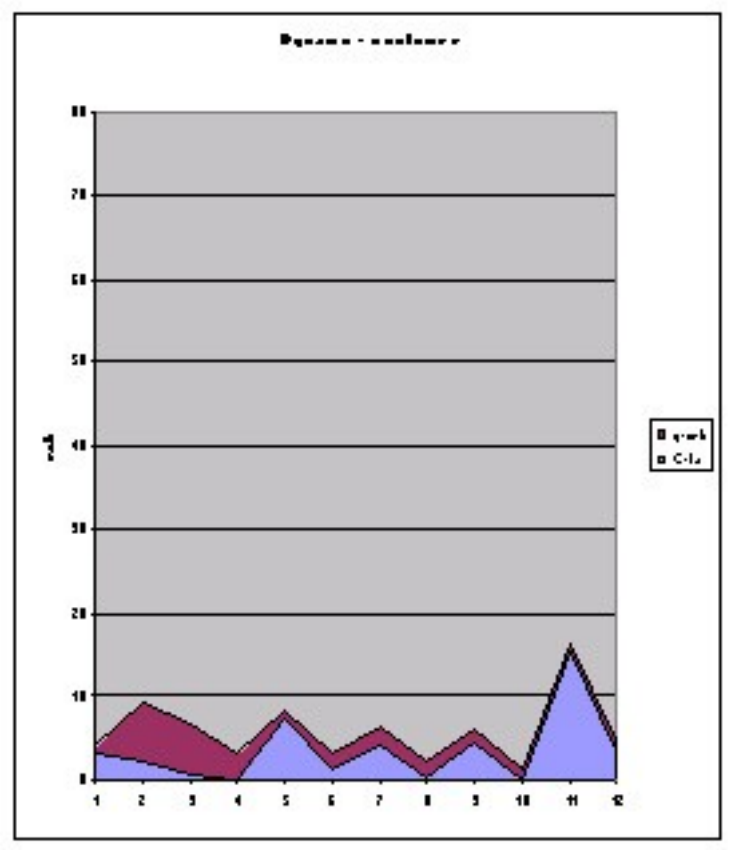
Mean number of words per utterance: 3,8

Customer using prototype vocabulary / Clicker 4



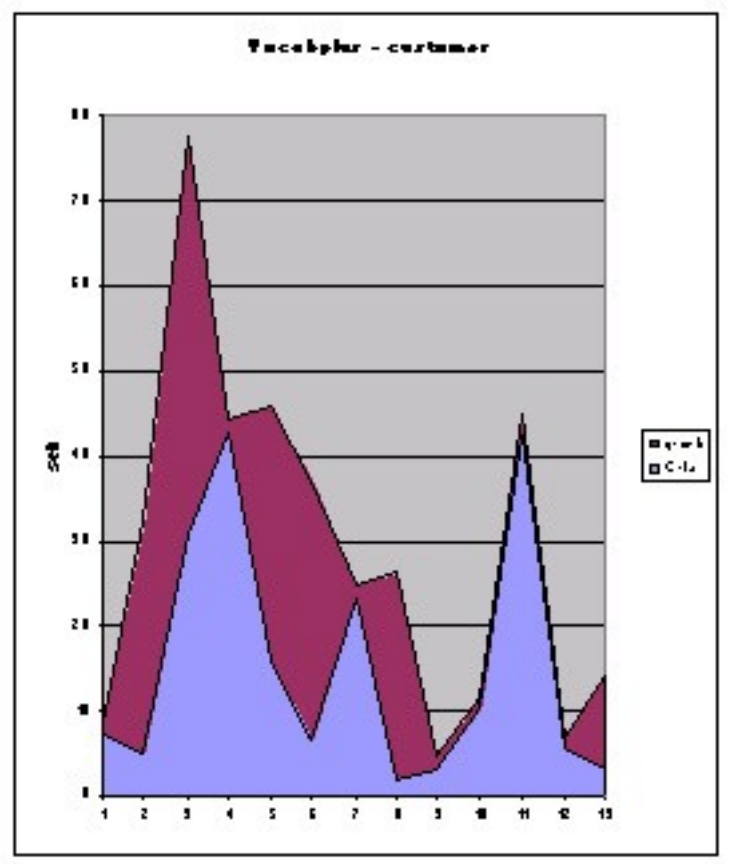
Mean number of words per utterance: 2,2

Customer using prototype vocabulary / Dynamo



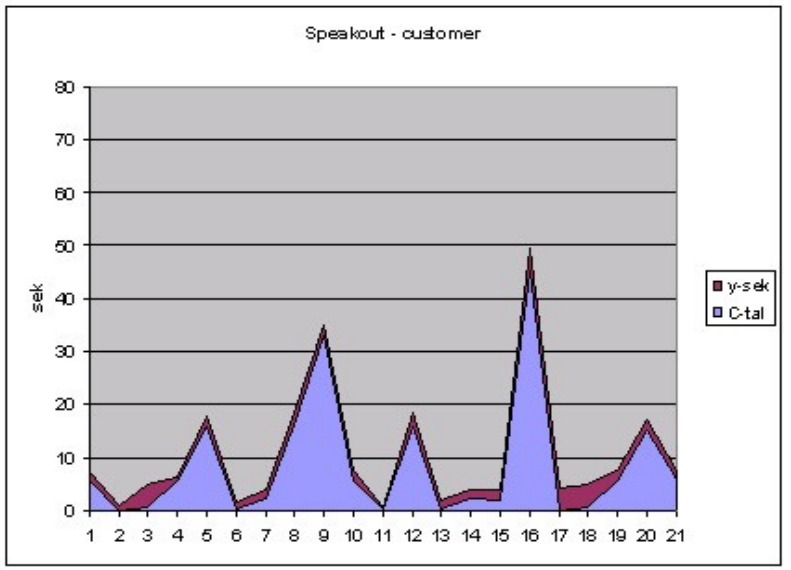
Mean number of words per utterance: 2,5

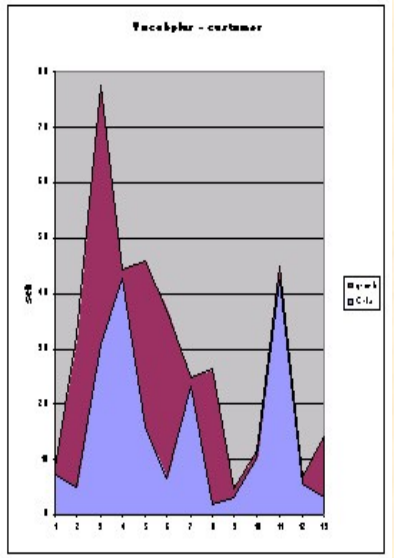
Customer using Vocab plus

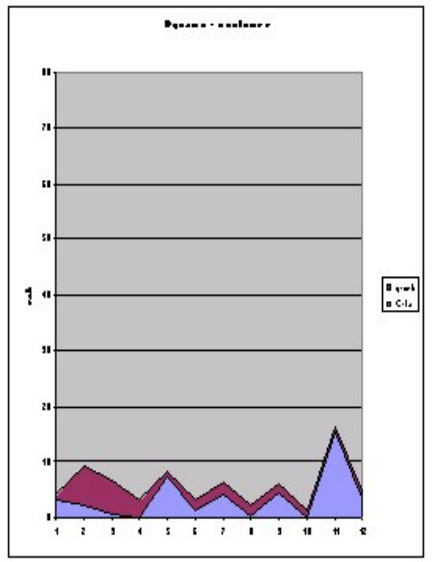


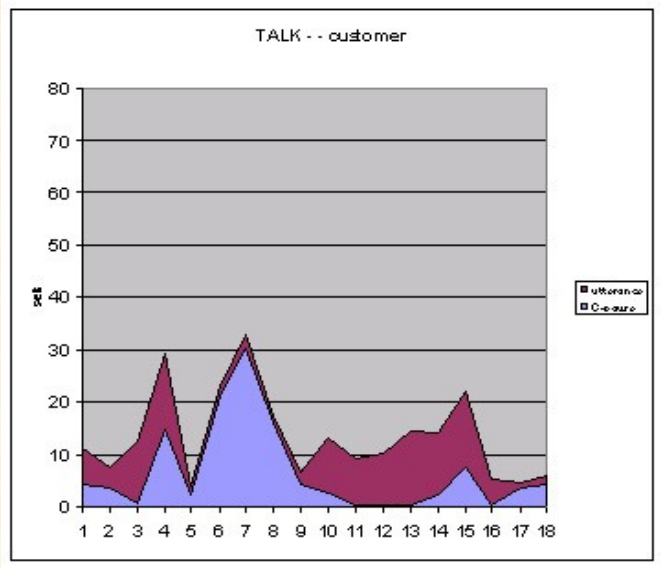
The vocabulary spoke one word at the time – that's why the utterances look so long – it was the complete phrase that was counted as one utterance

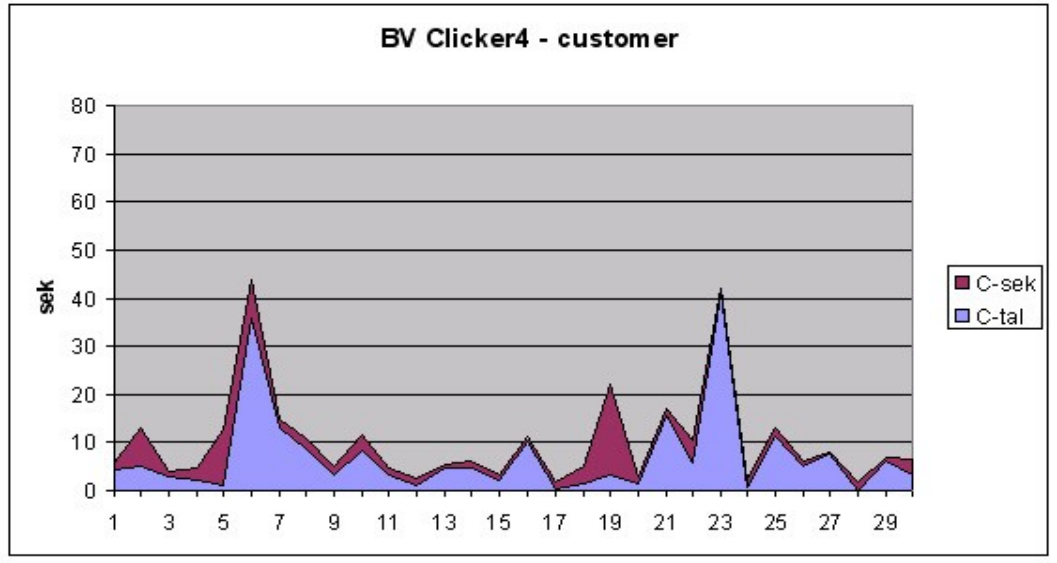
Mean number of words per utterance: 2,3


Speakout - customer
sek
y-sek
C-tal

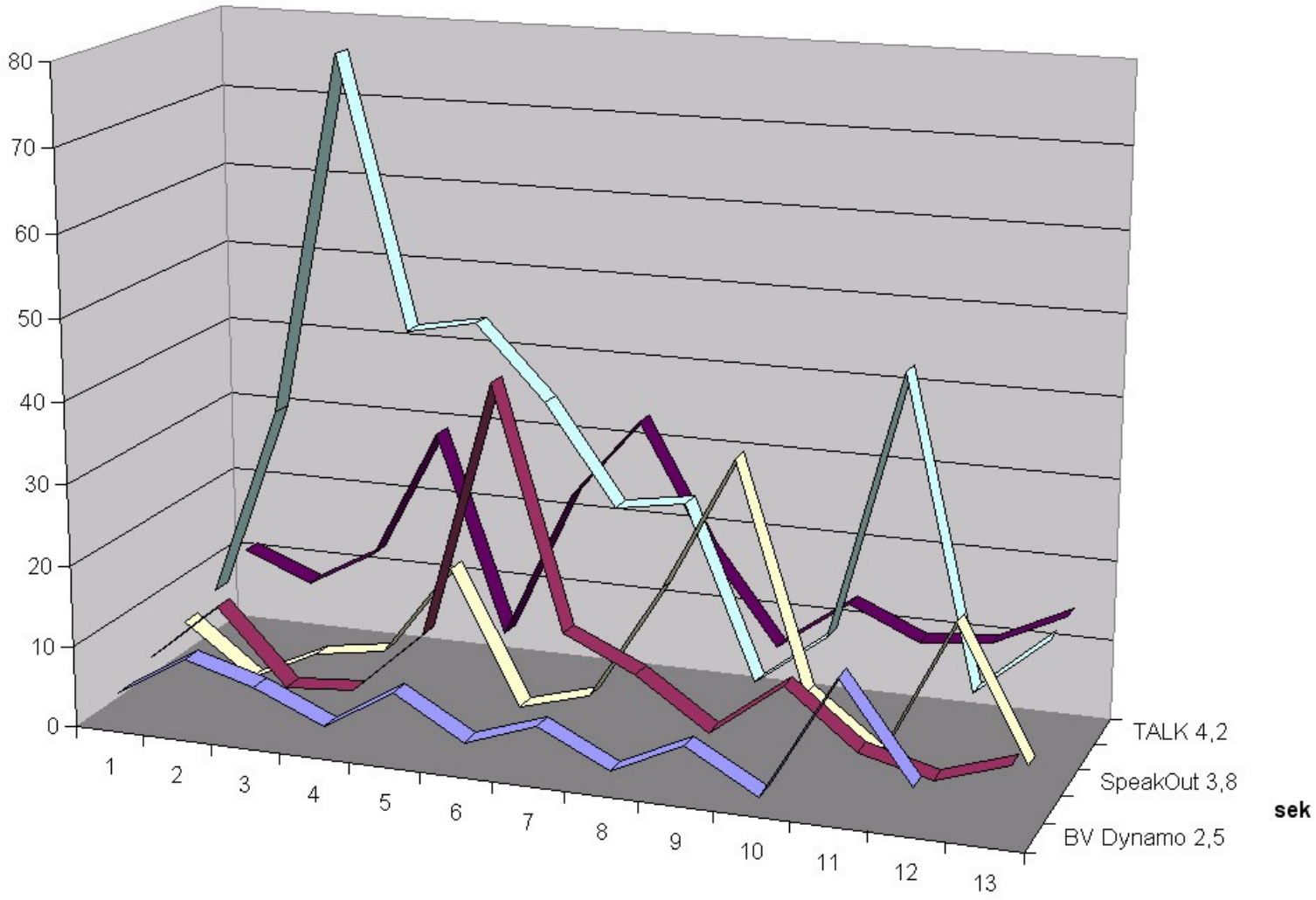





TALK - - customer
sek


BV Clicker4 - customer
sek
C-sek
C-tal

Combination: pause before utterance + utterance length, selected VOCA:s



Other aspects than speed

It is important to use all available modalities, also eye gaze and gestures.

Look up when you have completed your utterance!

What are we going to do next?

- Continue analyzing the role play trials
- Make modifications to the prototype vocabularies
- Talk to manufactureres about the translations of vocabularies
- Try to implement activity-based modules in currently available vocabularies

- Next step is to involve AAC users in the trials.
- We are also going to look at the multimodal aspects of using a VOCA in different activities.
- Learn more about Swedish spoken language- look at more activities, first other types of shops, but then telephone conversations and other activities.

Look for updated information about the project on the ISAAC Sweden web:

www.isaac-sverige.se

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