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Attrition Profiles:
What CDST can and
cannot tell us about
attrition

Attrition (& acquisition) and potential proficiency 'predictors'

- Age of arrival – length of residence – age at testing
- Gender
- Socioeconomic status – education
- Family status – partner – children
- Language use (quantity, quality, domains, ...)
- Attitudes – identity - motivation
- Language proficiency tests – aptitude tests – matched guise tests ...

Attrition (& acquisition) and potential proficiency 'predictors'

>> All a bit disappointing:

- Few, if any, significant interactions
- Confounded variables and 'cluster factors' (Köpke 2007)
- Large amount of unexplained variability

Which is to be expected if ...

Complex dynamic systems theory

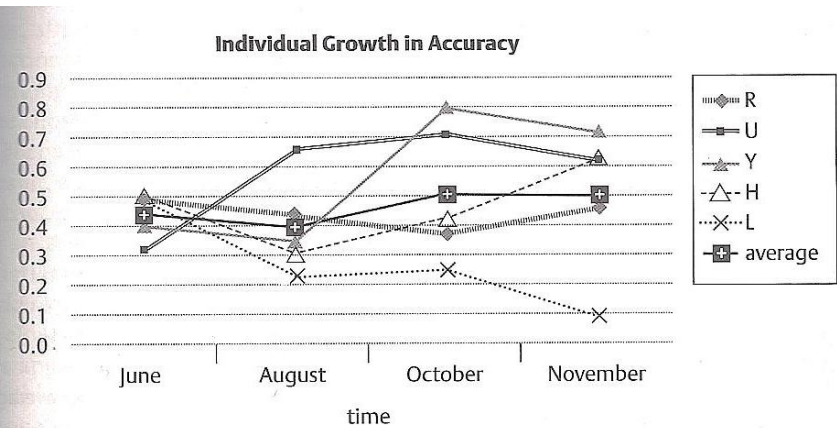
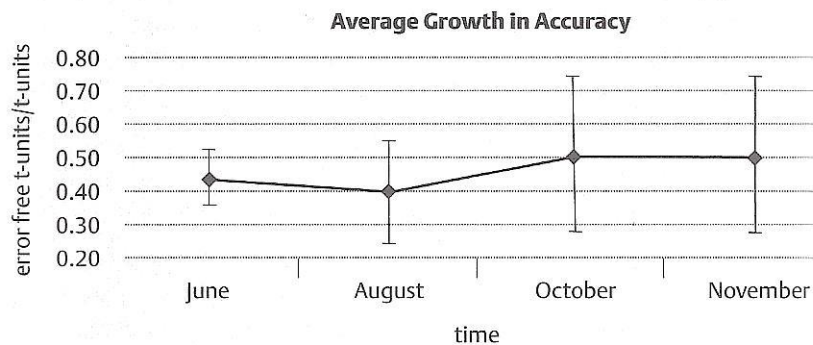


... language = a self-organising, emergent, situated, adaptive, non-linear, interconnected ... system

Complex dynamic systems theory

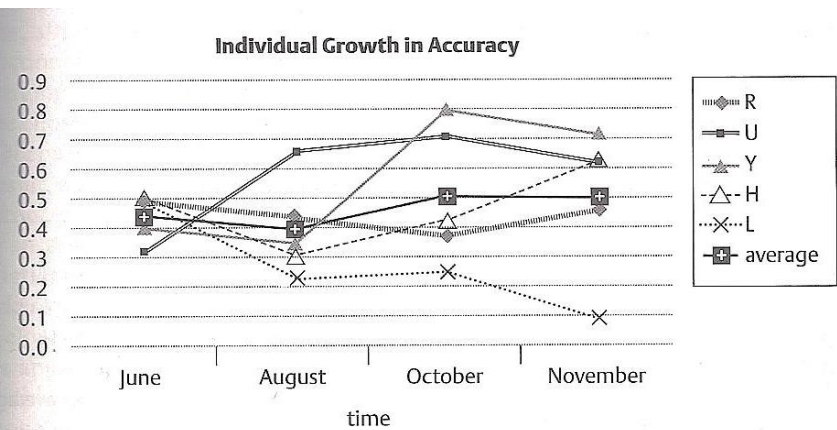
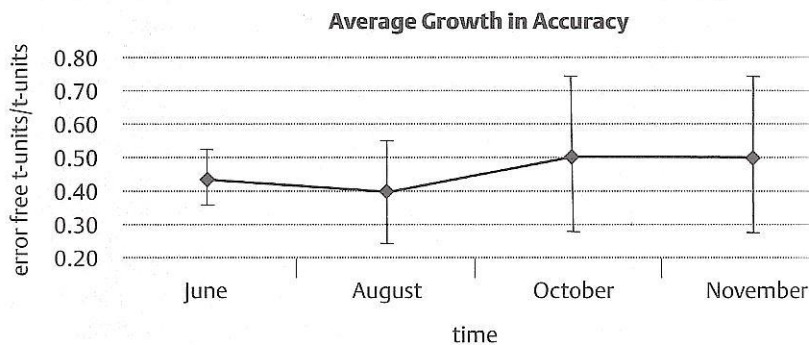
- Critiques traditional research designs in their singular quest for
 - generalisability and
 - statistical significance
 - as well as the theoretical justification of statistical methods for certain purposes

Noise?



Complex dynamic systems theory

- Emphasis on continual change & variability
- Complex interplay of multitude of variables
- No predictability
- No replicability
- BUT: Singular focus on the particular?
(>> Potentially also dissatisfactory ...)

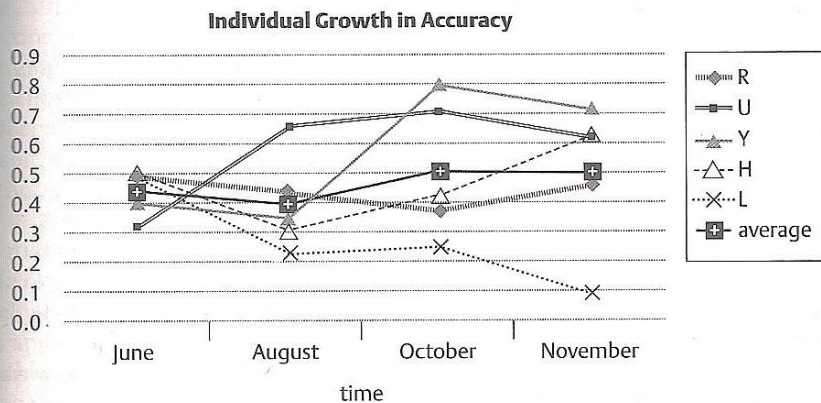


Complex dynamic systems theory

- If we reject simple linear causality, do we have to give up on generalizability?

(Larsen-Freeman, 2015/16, Lesson #5)

- Contingencies
- Potential
- Profiles/particular system configurations >> 'Archetypes' with 'signature dynamics'



Systems tend to settle in 'steady'/'attractor' states

A profile study of language attrition

(Opitz 2011)

- 27 adult German bilinguals
- Long-term residents in Ireland
- Cross-sectional and retrospective data
 - Internal and external variables (IVs)
 - Language proficiency in L1 and L2 English (DVs)
 - z-scores vis-à-vis native speaker baselines
 - Correlations
 - Bilingual profiles (cluster analysis)

A profile study of language attrition

- Significant correlations

with L1

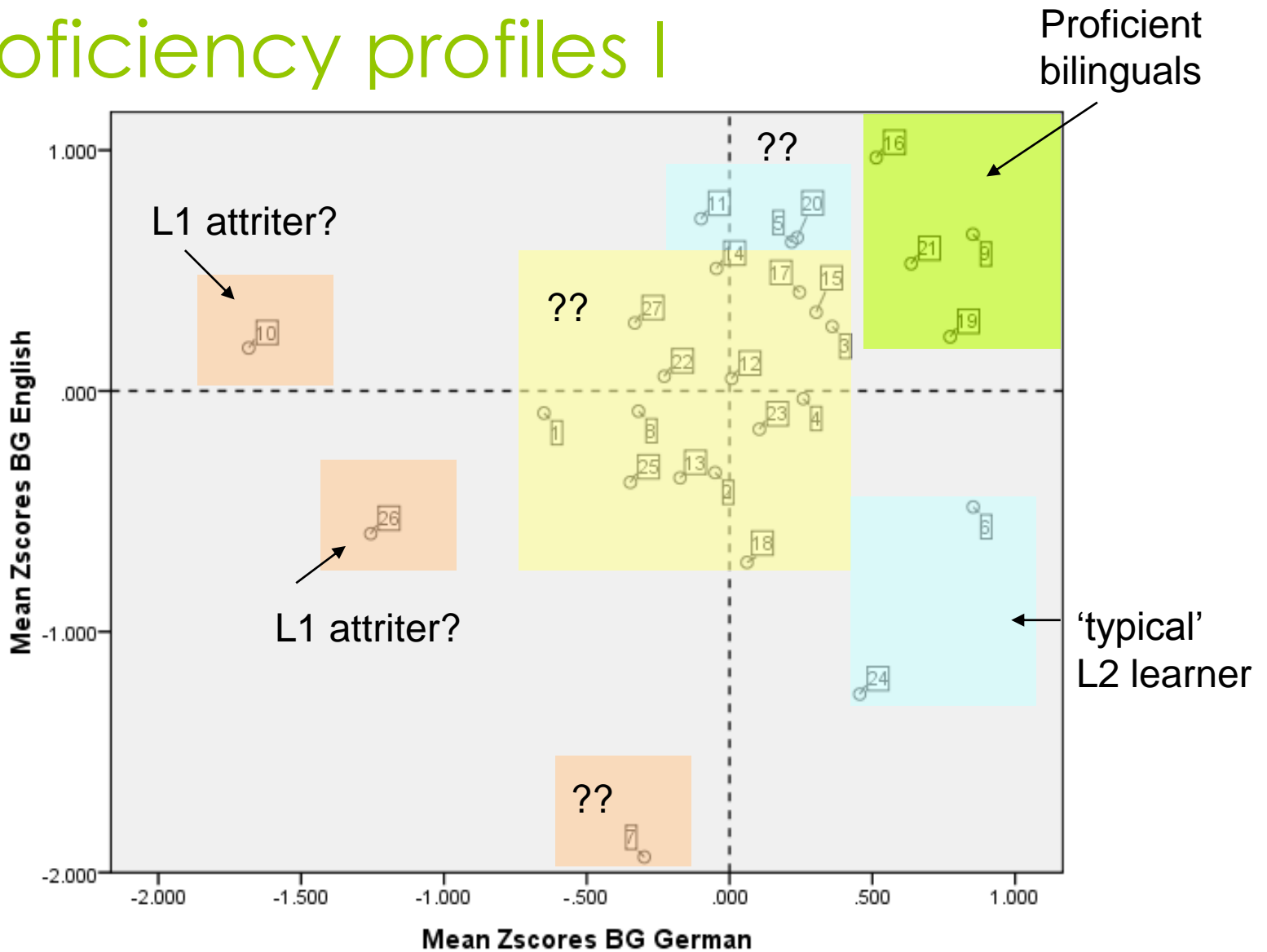
- - LOR,
+ education,
nationality
- + L1 use,
+ bilingual use
- + BL orientation
- + verbal skills

with L2

- gender,
+ No of languages,
+ partner
- + bilingual use
- + FL orientation,
- L1 orientation
- + verbal skills,
+ rule inference

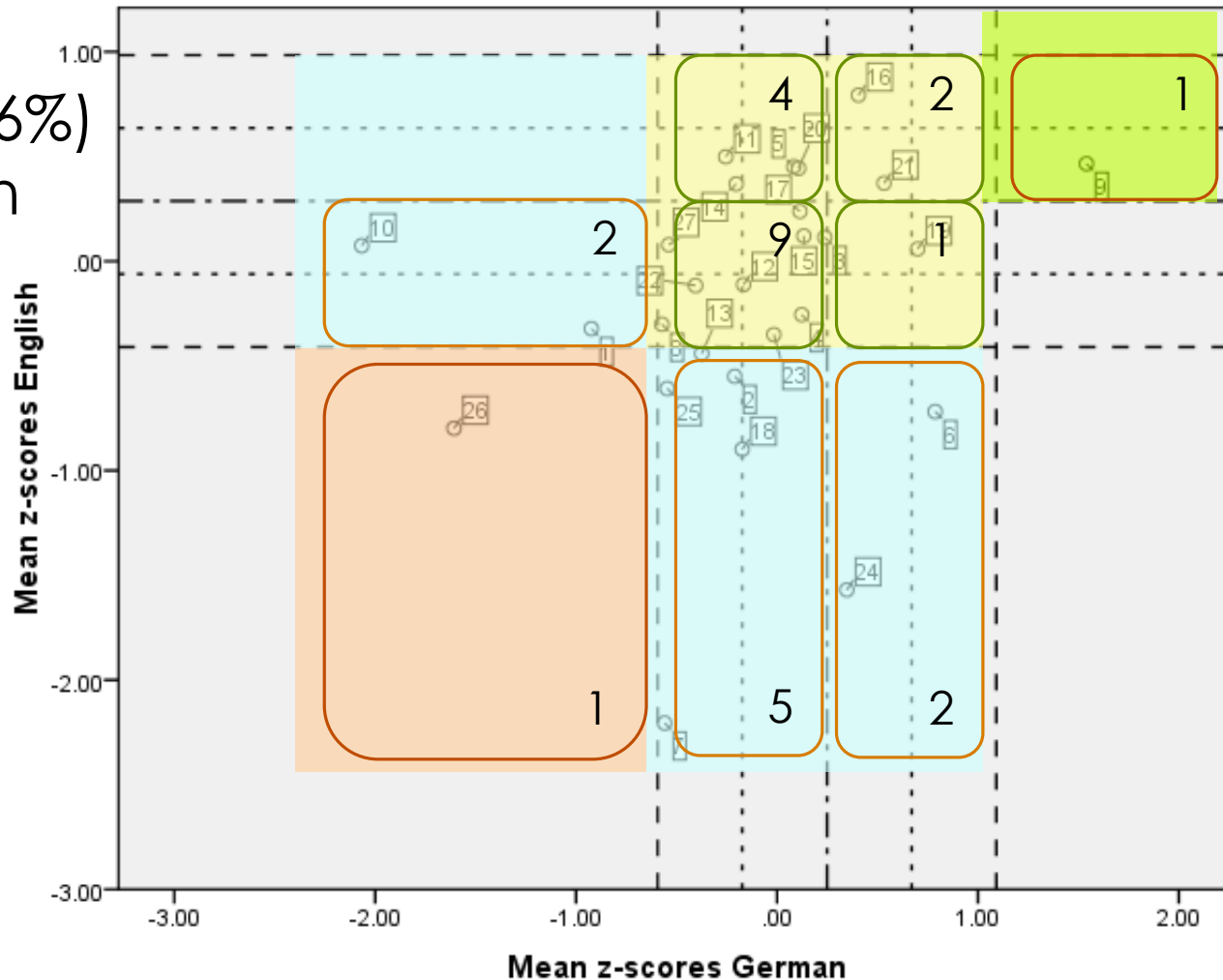
- NOT: German partner, children, age, aural skills ...
- Some (predictable) interactions between variables

Proficiency profiles I



Proficiency profiles II

17 (66%)
within
NSR



(Opitz
2010)

Cluster analysis

12 clusters, 2 criteria

➤ Relative proficiency level:

L1 dominant (9), balanced (12), L2 dominant (6)

➤ Absolute proficiency level

High + very high = above mean, 1st & 2nd STD

L1 (6: 4 >(>), 2 =); L2 (7: 4 >, 2 =, 1 <)

Medium = lower 1st STD

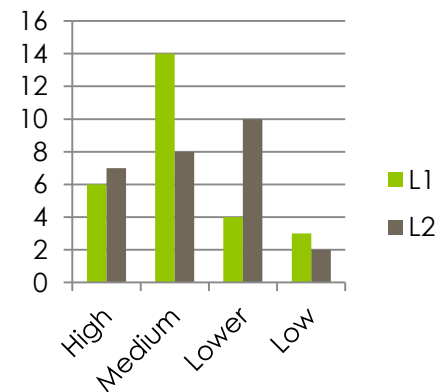
L1 (14: 4 >, 6 =, 4 <); L2 (8: 1 >>, 6 =, 1 <)

Lower = lower 2nd STD

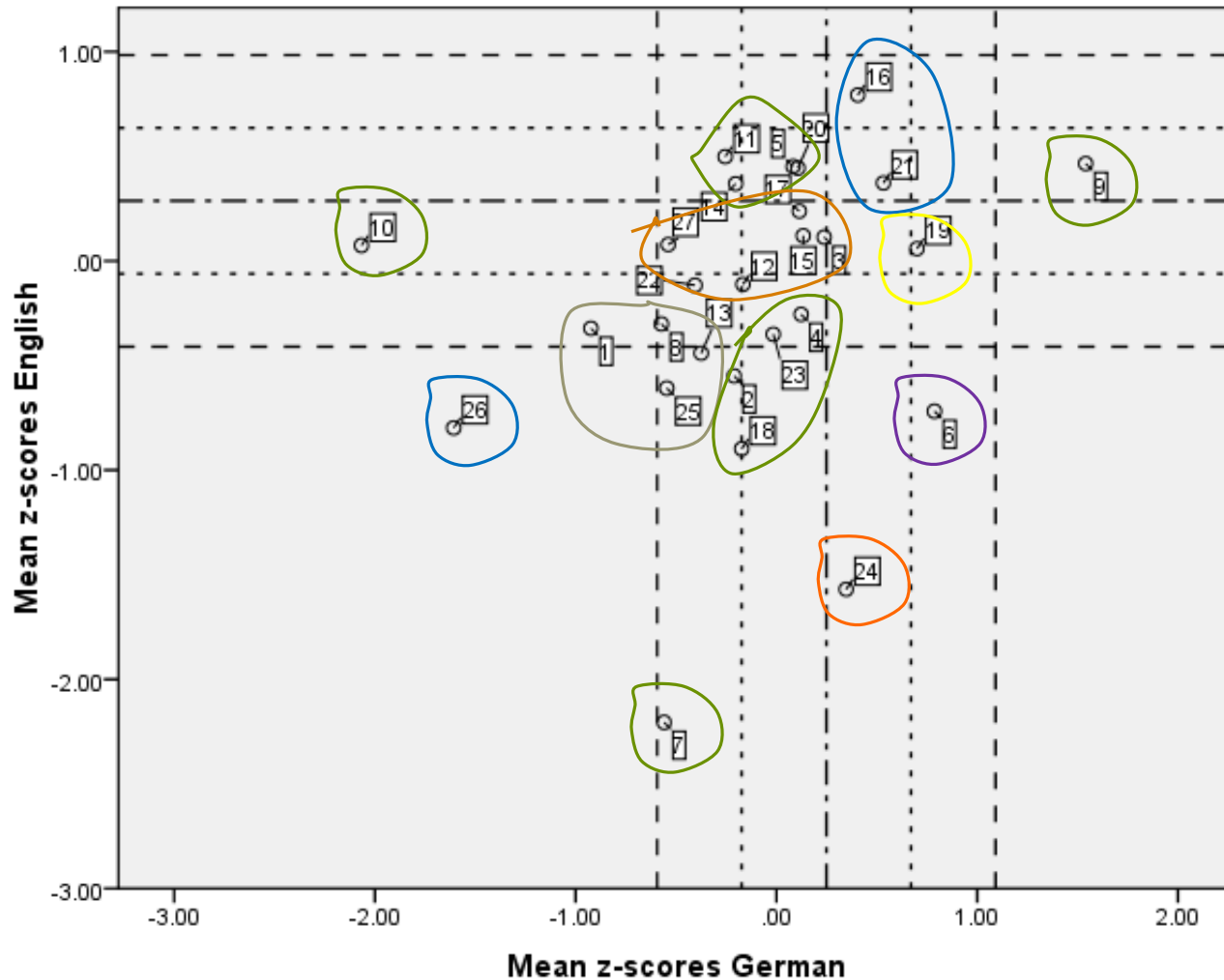
L1 (5: 1 >, 4 =); L2 (10: 1 >, 4 =, 5 <(<))

Low = below 2nd STD

L1 (2: 2 <(<)); Low L2 (2: 2 <(<))



Cluster analysis



	#	Participant	Gender	Age	LOR	AgeT	Partner	Childr	Educ	Use	Prof Use	Comments
(H)H L1 + H L2	9	Chloe	f	10	36	Irish	2	18	daily	daily	5 FLs, GL teacher	
	16	Sigrid	f	29	52	(Irish)	2	17	wk/d	daily	4 FLs, early FL, GL teacher	
	21	Gisela	f	34	56	Irish	3	18	weekly	rarely	4 FLs, GL teacher	
M L1 + H L2	5	Jutta	f	21	41	Irish	-	19	weekly	never	7 FLs + local	
	11	Elke	f	8	28	-	-	17	m/wk	rarely	6 FLs	
	20	Angela	f	8	36	Irish	-	17	rarely	weekly	5 FLs + local	
	14	Sabine	f	28	52	(English)	-	14	rarely	daily	3 FLs + local, translator	
H L1 + M L2	19	Bernd	m	12	46	German	1	17	wk/d	never	3 FLs	
M L1 + M L2	15	Kerstin	f	7-1	20	Irish	2	13	wk/d	rarely	3 FLs	
	12	Beate	f	7-2	23	-	-	16	wk/d	rarely	3 FLs	
	27	Erika	f	7-2	22	Irish	1	17	wk/d	monthly	2 FLs, (guide)	
	17	Tanja	f	7-1	21	English	3	18	daily	weekly	FLs, early FL, (GL teacher)	
	3	Ulli	f	7-1	13	Irish	-	17	monthly	daily	3 FLs + local, guide	
	22	Anita	f	7-2	27	Irish	1	20	daily	daily	3 FLs, GL teacher	
H L1 + LL L2	24	Juliane	f	10	39	German	2	17	daily	daily	4 FLs, GL teacher	
H L1 + L L2	6	Ina	f	14	50	German	1 (1)	17	daily	daily	3 FLs, translator training	
M L1 + L L2	18	Sophie	f	8-2	19	Irish	1	19	daily	daily	2 FLs, GL teacher	
	4	Sylvia	f	8-1	17	Irish	1	17	wk/d	weekly	2 FLs, (translator)	
	2	Madeleine	f	8-2	15	Irish	2	17	wk/d	rarely	5 FLs	
	23	Alexandra	f	8-1	8	Irish	-	17	wk/d	rarely	4 FLs, (translator)	
L L1 + LL L2	7	Thomas	m	24	49	German	2	13	daily	daily	2 FLs + local	
L L1 + L L2	13	Ernst	m	9-1	23	German	2	17	daily	daily	3 FLs + local	
	8	Frank	m	9-2	24	(German)	4	11	monthly	never	1 FL	
	1	Peggy	f	9-2	26	Irish	3	17	monthly	rarely	1 FL	
	25	Stefan	m	9-2	10	foreign	-	13	weekly	never	2 FLs	
LL L1 + M L2	10	Annedore	f	31	53	Irish	-	13	rarely	rarely	4 FLs + local,	
LL L1 + L L2	26	Walter	m	29	56	Irish	2	13	monthly	daily	1 FL, guide	

Cluster analysis

- Some trends, but generally mixed patterns
- In each cluster, presence of participants whose background appears to be different from that of the others, and counterintuitive in relation to the profile
 - Gisela (HL1 + HL2): German language use
 - Sabine (ML1 + HL2): education, German language use, English language use
- Across clusters, participants with apparently similar background, yet diverging profiles

Trend 1: L1 use for H L1

But:

But:

But:

But:

	A	B	C	D	E	F	G	H	I	J	K	L	M
	#	Participant	Cluster	Gender	LOR	Age	Partner	Children	Educ	Use	Prof Use	Comments	
2	(H)H L1 + H L2	9	Chloe	1	f	10	36	Irish	2	18	daily	daily	5 FLs, GL teacher
3		16	Sigrid	2	f	29	52	(Irish)	2	17	wk/d	daily	4 FLs, early FL, GL teacher
4		21	Gisela	2	f	34	56	Irish	3	18	weekly	rarely	4 FLs, GL teacher
6	M L1 + H L2	5	Jutta	6	f	21	41	Irish	-	19	weekly	never	7 FLs + local
7		11	Elke	6	f	8	28	-	-	17	m/wk	rarely	6 FLs
8		20	Angela	6	f	8	36	Irish	-	17	rarely	weekly	5 FLs + local
9		14	Sabine	6	f	28	52	(English)	-	14	rarely	daily	3 FLs + local, translator
11	H L1 + M L2	19	Bernd	3	m	12	46	German	1	17	wk/d	never	3 FLs
12	M L1 + M L2	15	Kerstin	7-1	f	20	44	Irish	2	13	wk/d	rarely	3 FLs
13		12	Beate	7-2	f	23	49	-	-	16	wk/d	rarely	3 FLs
14		27	Erika	7-2	f	22	44	Irish	1	17	wk/d	monthly	2 FLs, (guide)
15		17	Tanja	7-1	f	21	40	English	3	18	daily	weekly	2 FLs, early FL, (GL teacher)
16		3	Ulli	7-1	f	13	42	Irish	-	17	monthly	daily	3 FLs + local, guide
17		22	Anita	7-2	f	27	55	Irish	1	20	daily	daily	3 FLs, GL teacher
19	H L1 + LL L2	24	Juliane	5	f	10	39	German	2	17	daily	daily	4 FLs, GL teacher
20	H L1 + LL L2	6	Ina	4	f	14	50	German	1 (1)	17	daily	daily	3 FLs, translator training
21	M L1 + LL L2	18	Sophie	8-2	f	19	48	Irish	1	19	daily	daily	2 FLs, GL teacher
22		4	Sylvia	8-1	f	17	44	Irish	1	17	wk/d	weekly	2 FLs, (translator)
23		2	Madeleine	8-2	f	15	49	Irish	2	17	wk/d	rarely	5 FLs
24		23	Alexandra	8-1	f	8	32	Irish	-	17	wk/d	rarely	4 FLs, (translator)
26	L L1 + LL L2	7	Thomas	10	m	24	49	German	2	13	daily	daily	2 FLs + local
27	L L1 + LL L2	13	Ernst	9-1	m	23	65	German	2	17	daily	daily	3 FLs + local
28		8	Frank	9-2	m	24	66	German	4	11	monthly	never	1 FL
29		1	Peggy	9-2	f	26	48	Irish	3	17	monthly	rarely	1 FL
30		25	Stefan	9-2	m	10	31	foreign	-	13	weekly	never	2 FLs

Trend 2: Foreign languages ≠ Education for H L2

	#	Participant	Cluster	Gender	LOR	AgeT	Partner	Children	Educ	Use	Prof Use	Comments
(H)H L1 + H L2	9	Chloe	1	f	10	36	Irish	2	18	daily	daily	5 FLs, GL teacher
	16	Sigrid	2	f	29	52	(Irish)	2	17	wk/d	daily	4 FLs, early FL, GL teacher
	21	Gisela	2	f	34	56	Irish	3	18	weekly	rarely	4 FLs, GL teacher
M L1 + H L2	5	Jutta	6	f	21	41	Irish	-	19	weekly	never	7 FLs + local
	11	Elke	6	f	8	28	-	-	17	m/wk	rarely	6 FLs
	20	Angela	6	f	8	36	Irish	-	17	rarely	weekly	5 FLs + local
	14	Sabine	6	f	28	52	(English)	-	14	rarely	daily	3 FLs + local, translator
H L1 + M L2	19	Bernd	3	m	12	46	German	1	17	wk/d	never	3 FLs
M L1 + M L2	15	Kerstin	7-1	f	20	44	Irish	2	13	wk/d	rarely	3 FLs
	12	Beate	7-2	f	23	49	-	-	16	wk/d	rarely	3 FLs
	27	Erika	7-2	f	22	44	Irish	1	17	wk/d	monthly	2 FLs, (guide)
	17	Tanja	7-1	f	21	40	English	3	18	daily	weekly	2 FLs, early FL, (GL teacher)
	3	Ulli	7-1	f	13	42	Irish	-	17	monthly	daily	3 FLs + local, guide
	22	Anita	7-2	f	27	55	Irish	1	20	daily	daily	3 FLs, GL teacher
H L1 + LL L2	24	Juliane	5	f	10	39	German	2	17	daily	daily	4 FLs, GL teacher
H L1 + LL L2	6	Ina	4	f	14	50	German	1 (1)	17	daily	daily	3 FLs, translator training
M L1 + LL L2	18	Sophie	8-2	f	19	48	Irish	1	19	daily	daily	2 FLs, GL teacher
	4	Sylvia	8-1	f	17	44	Irish	1	17	wk/d	weekly	2 FLs, (translator)
	2	Madeleine	8-2	f	15	49	Irish	2	17	wk/d	rarely	5 FLs
	23	Alexandra	8-1	f	8	32	Irish	-	17	wk/d	rarely	4 FLs, (translator)
LL L1 + LL L2	7	Thomas	10	m	24	49	German	2	13	daily	daily	2 FLs + local
LL L1 + LL L2	13	Ernst	9-1	m	23	65	German	2	17	daily	daily	3 FLs + local
	8	Frank	9-2	m	24	66	German	4	11	monthly	never	1 FL
	1	Peggy	9-2	f	26	48	Irish	3	17	monthly	rarely	1 FL
	25	Stefan	9-2	m	10	31	foreign	-	13	weekly	never	2 FLs

But:

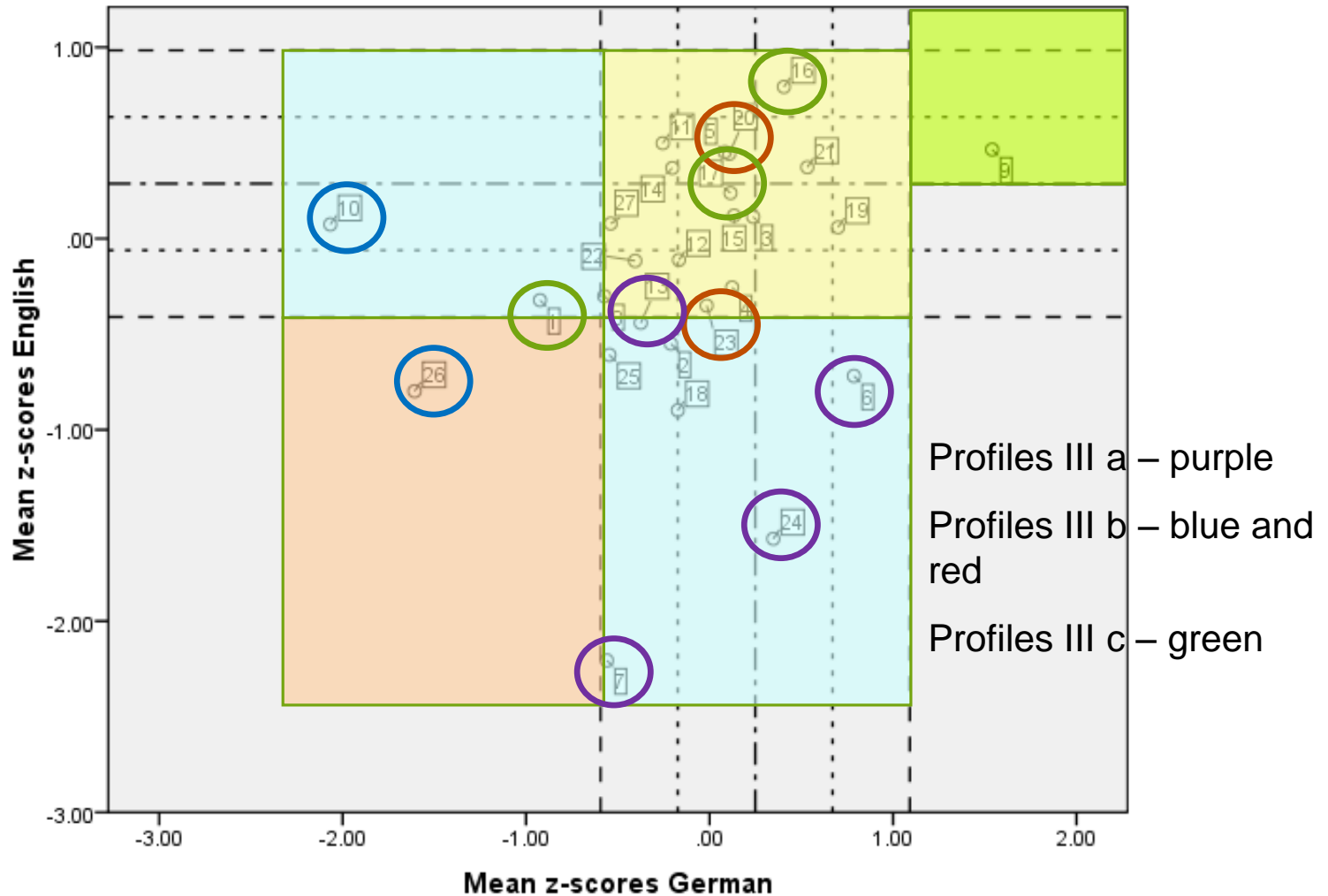
But:

But:

Trend 3: The male (+ age?) factor

	#	Participant	Cluster	Gender	LOR	AgeT	Partner	Children	Educ	Use	Prof Use	Comments	
(H)H L1 + H L2	9	Chloe	1	f	10	36	Irish	2	18	daily	daily	5 FLs, GL teacher	
	16	Sigrid	2	f	29	52	(Irish)	2	17	wk/d	daily	4 FLs, early FL, GL teacher	
	21	Gisela	2	f	34	56	Irish	3	18	weekly	rarely	4 FLs, GL teacher	
M L1 + H L2	5	Jutta	6	f	21	41	Irish	-	19	weekly	never	7 FLs + local	
	11	Elke	6	f	8	28	-	-	17	m/wk	rarely	6 FLs	
	20	Angela	6	f	8	36	Irish	-	17	rarely	weekly	5 FLs + local	
	14	Sabine	6	f	28	52	(English)	-	14	rarely	daily	3 FLs + local, translator	
But: H L1 + M L2	19	Bernd	3	m	12	46	German	1	17	wk/d	never	3 FLs	
	M L1 + M L2	15	Kerstin	7-1	f	20	44	Irish	2	13	wk/d	rarely	3 FLs
		12	Beate	7-2	f	23	49	-	-	16	wk/d	rarely	3 FLs
	27	Erika	7-2	f	22	44	Irish	1	17	wk/d	monthly	2 FLs, (guide)	
	17	Tanja	7-1	f	21	40	English	3	18	daily	weekly	2 FLs, early FL, (GL teacher)	
	3	Ulli	7-1	f	13	42	Irish	-	17	monthly	daily	3 FLs + local, guide	
	22	Anita	7-2	f	27	55	Irish	1	20	daily	daily	3 FLs, GL teacher	
H L1 + LL L2	24	Juliane	5	f	10	39	German	2	17	daily	daily	4 FLs, GL teacher	
H L1 + L L2	6	Ina	4	f	14	50	German	1 (1)	17	daily	daily	3 FLs, translator training	
M L1 + L L2	18	Sophie	8-2	f	19	48	Irish	1	19	daily	daily	2 FLs, GL teacher	
	4	Sylvia	8-1	f	17	44	Irish	1	17	wk/d	weekly	2 FLs, (translator)	
	2	Madeleine	8-2	f	15	49	Irish	2	17	wk/d	rarely	5 FLs	
	23	Alexandra	8-1	f	8	32	Irish	-	17	wk/d	rarely	4 FLs, (translator)	
L L1 + LL L2	7	Thomas	10	m	24	49	German	2	13	daily	daily	2 FLs + local	
L L1 + L L2	13	Ernst	9-1	m	23	65	German	2	17	daily	daily	3 FLs + local	
	8	Frank	9-2	m	24	66	German	4	11	monthly	never	1 FL	
	1	Peggy	9-2	f	26	48	Irish	3	17	monthly	rarely	1 FL	
But:	25	Stefan	9-2	m	10	31	foreign	-	13	weekly	never	2 FLs	

Proficiency profiles III



Proficiency profiles III a:

Similar backgrounds, variable outcomes:

	#	Participa	Clus	Gen	LOR	AgeT	Partner	Childr	Educ	Use	Prof Use	Comments
H L1 + LL L2	24	Juliane	5	f	10	39	German	2	17	daily	daily	4 FLs, GL teacher
H L1 + L L2	6	Ina	4	f	14	50	German	1 (1)	17	daily	daily	3 FLs, translator training
L L1 + LL L2	7	Thomas	10	m	24	49	German	2	13	daily	daily	2 FLs + local
L L1 + L L2	13	Ernst	9-1	m	23	65	German	2	17	daily	daily	3 FLs + local

Juliane & Ina vs. Thomas & Ernst

- Thomas, Ernst: insufficient role of L1 use for L1 maintenance > knowledge of other languages (>> metalinguistic knowledge)?
- Juliane, Ina: insufficient role of such knowledge for H L2
- Thomas, Ernst: role of age? (but opposite direction of effect)

Proficiency profiles III b

Similar backgrounds, variable outcomes:

	#	Participa	Clus	Gen	LOR	Age	Partner	Childr	Educ	Use	Prof Use	Comments
M L1 + H L2	20	Angela	6	f	8	36	Irish	-	17	rarely	weekly	5 FLs + local
M L1 + L L2	23	Alexandra	8-1	f	8	32	Irish	-	17	wk/d	rarely	4 FLs, (translator)
LL L1 + M L2	10	Annedore	11	f	31	53	Irish	-	13	rarely	rarely	4 FLs + local,
LL L1 + L L2	26	Walter	12	m	29	56	Irish	2	13	monthly	daily	1 FL, guide

- Angela: frequent L2 use and other language knowledge supporting H L2, but not sufficient (Alexandra, Annedore)
- Angela, Walter: insufficient role of professional L1 use for H L1
- Walter: role of anxiety

Proficiency profiles III c

Individual narratives

	#	Participa	Clus	Gen	LOR	Age	Partner	Childr	Educ	Use	Prof Use	Comments
H L1 + H L2	16	Sigrid	2	f	29	52	(Irish)	2	17	wk/d	daily	4 FLs, early FL, GL teacher
L L1 + L L2	1	Peggy	9-2	f	26	48	Irish	3	17	monthly	rarely	1 FL
M L1 + M L2	17	Tanja	7-1	f	21	40	English	3	18	daily	weekly	FLs, early FL, (GL teacher)

- Sigrid: cluster of variables supporting H L1 and L2 (long LOR, frequent L1 (professional) use, metalinguistic skills) + verbal brain training
- Peggy: changing attitudes towards L1 & interactions with children impacting on language use
- Tanja: system in flux – L1/L2 relearning

Conclusions

- Trends: Education & other language knowledge combine with LOR and language use for H L1 and L2
- Data bear out the variable nature and complex interactions of 'predictors'
- Profile studies useful in providing detailed qualitative data to complement quantitative findings
- CDST = meta-theory compatible with constructivist, functionalist, emergentist, usage-based conceptions of language development

Complex Dynamic Systems Theory

- Difficult to capture in models
- Need for detailed longitudinal case studies
- Need for new methods capable of tapping and demonstrating dynamic variables
- Need for analytical methods capable of making sense of complex data

>> Not so disappointing after all

Thank you!
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