

# Fighting AN

A complex system's approach to a client-therapist text message interaction

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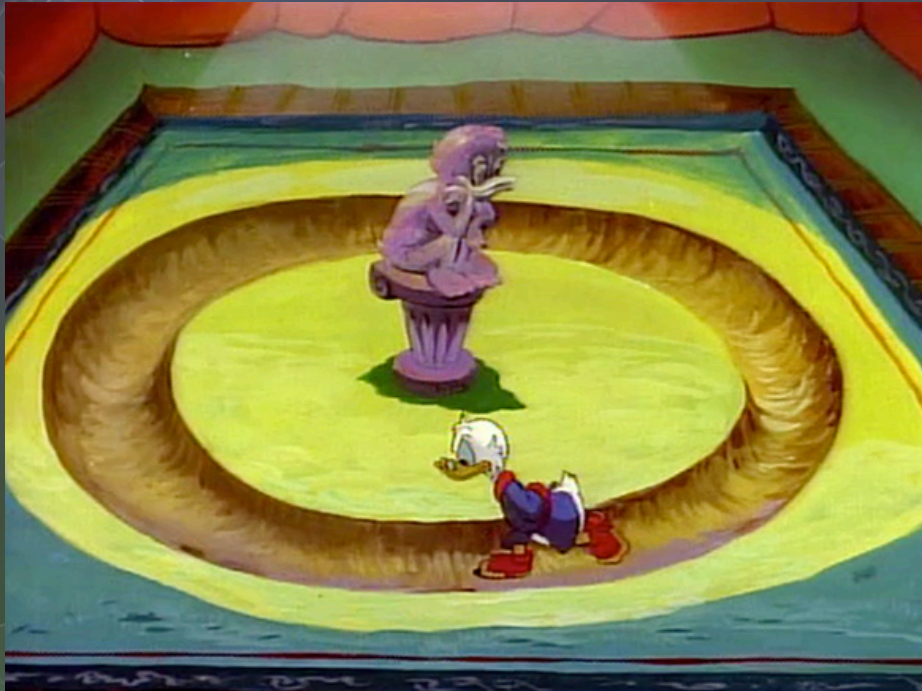
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# Case

- 25-year old woman with a severe, restricted type of Anorexia Nervosa that already lasted 12 years; 7 hospitalisations up until start of relational therapy
- Slim prospects on recovery
- NB Dutch AN-treatment is drip-feeding until a non-life threatening weight (35 kg = 77 lbs) then discharge from hospital.
- Clinics take care for patients without life-threatening weight

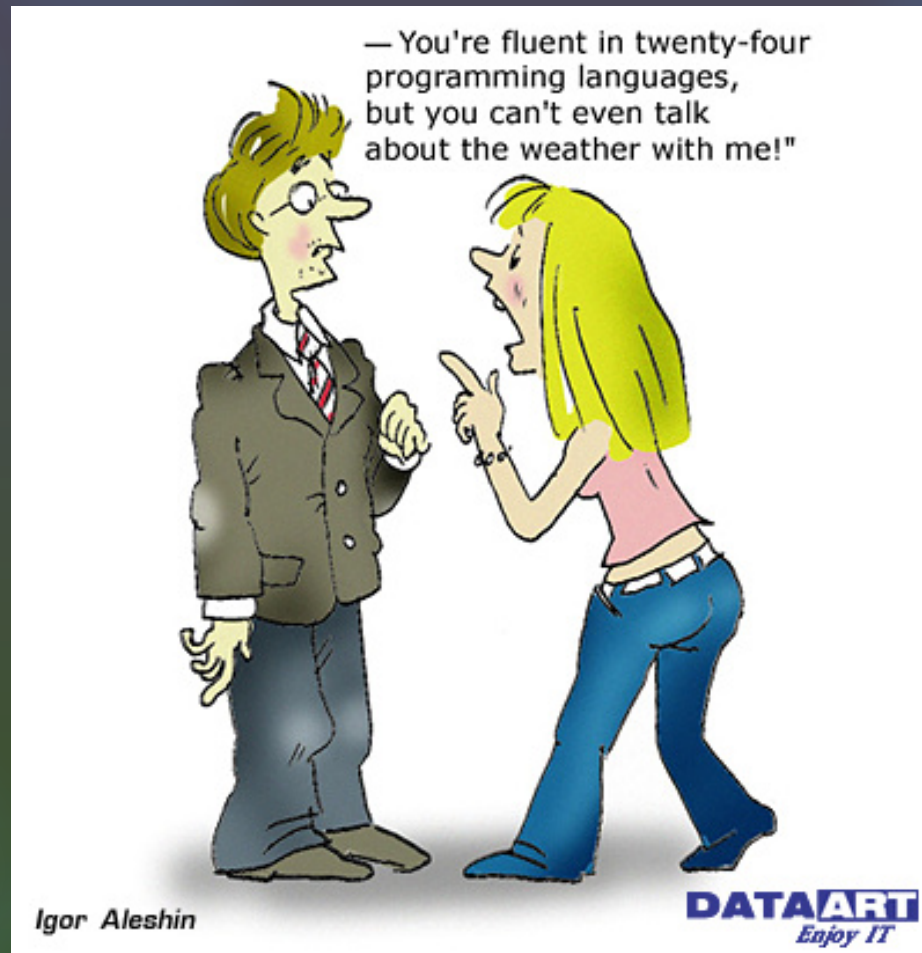
## What to do?

# Model of pathology: too constraint





# Model of pathology: too loose





# Relational therapy

Establishing either more or less synchrony,

leading to an increase of togetherness as well  
as an awareness of the/a Other

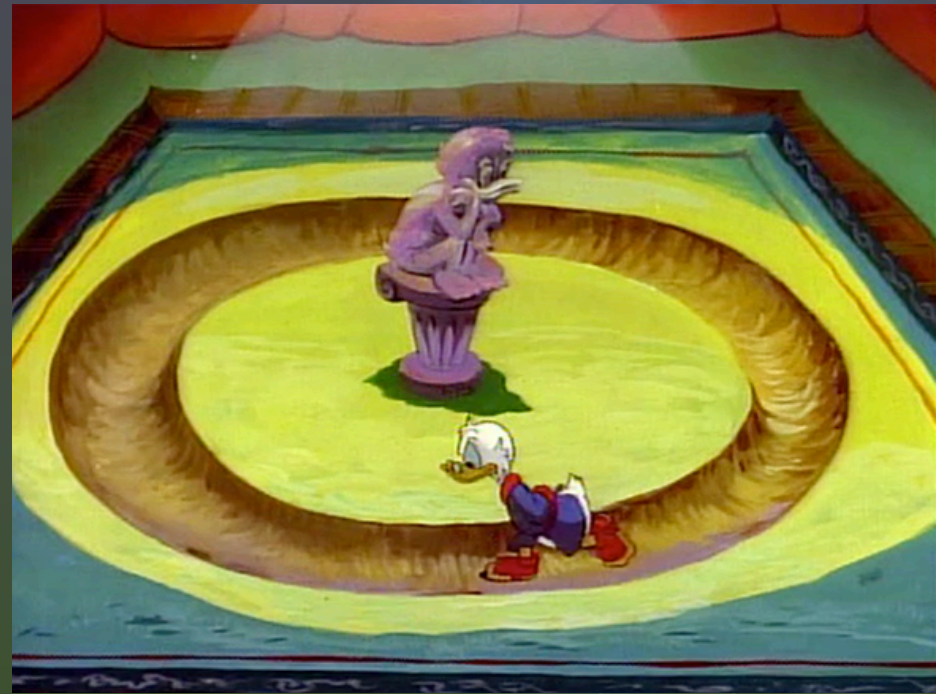
# Thus alternate between

— You're fluent in twenty-four programming languages, but you can't even talk about the weather with me!"



Igor Aleshin

**DATAART**  
Enjoy IT



# Materials

## **4037 text messages exchanged**

One-day exchanges

client: 1644; therapist: 1756

## **Analyses of text messages**

Characters: taller, hahahaha!@# XXX!!!

Words: taller hahahaha xxx

Semantics: tall haha kiss

## **Resolution levels**

number of days constituting data points: 1-7



# Recurrence Quantification Analysis

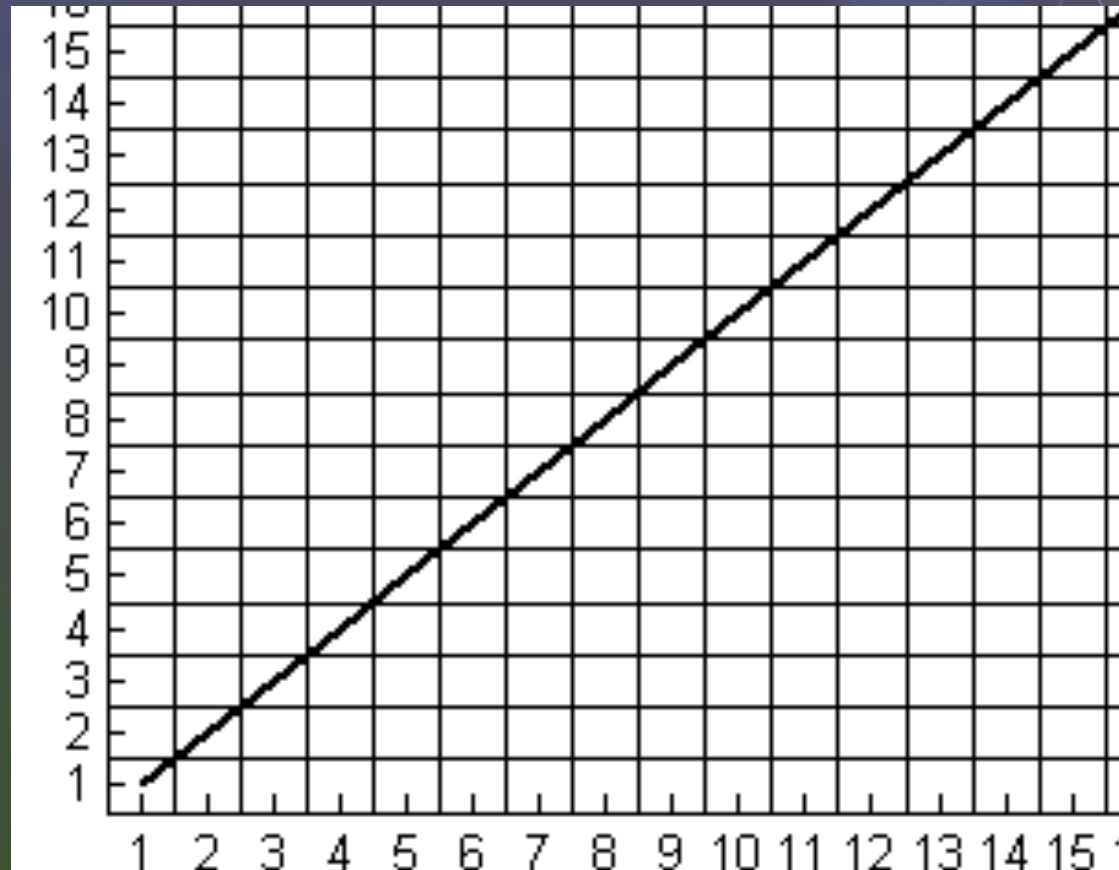


een / one	1
twee / two	2
drie / three	3
vier / four	4
hoedje / small cap	5
van / of	6
hoedje / small cap	5
van / of	6
een / one	1
twee / two	2
drie / three	3
vier / four	4
hoedje / small cap	5
van / of	6
papier / paper	7

# Auto Recurrence

1 2 3 4 5 6 7 1 2 3 4 5 6 7

one two three four small cap of small cap  
of.....paper



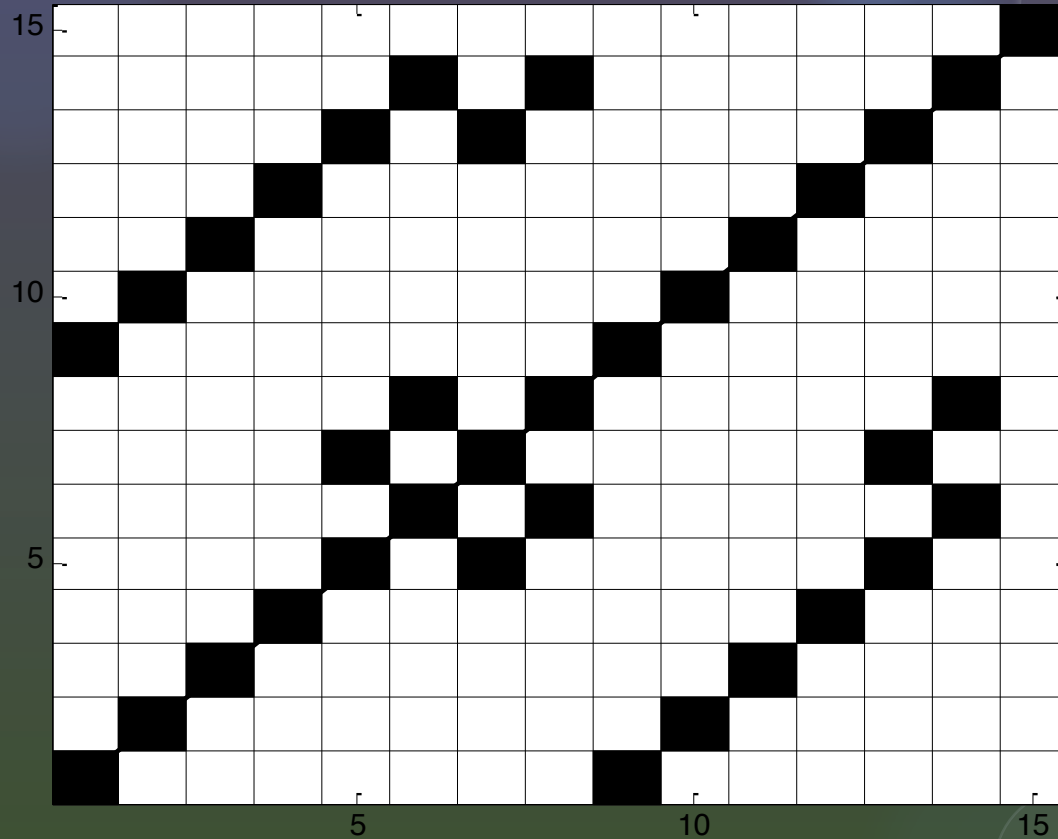
1 2 3 4 5 6 5 6 1 2 3 4 5 6 7

one two three four small cap of small cap  
of.....paper

# Auto Recurrence

20% recurrence

1 2 3 4 5 6 7  
 one two three four small cap of small cap  
 of.....paper



1 2 3 4 5 6 5 6 1 2 3 4 5 6 7  
 one two three four small cap of small cap  
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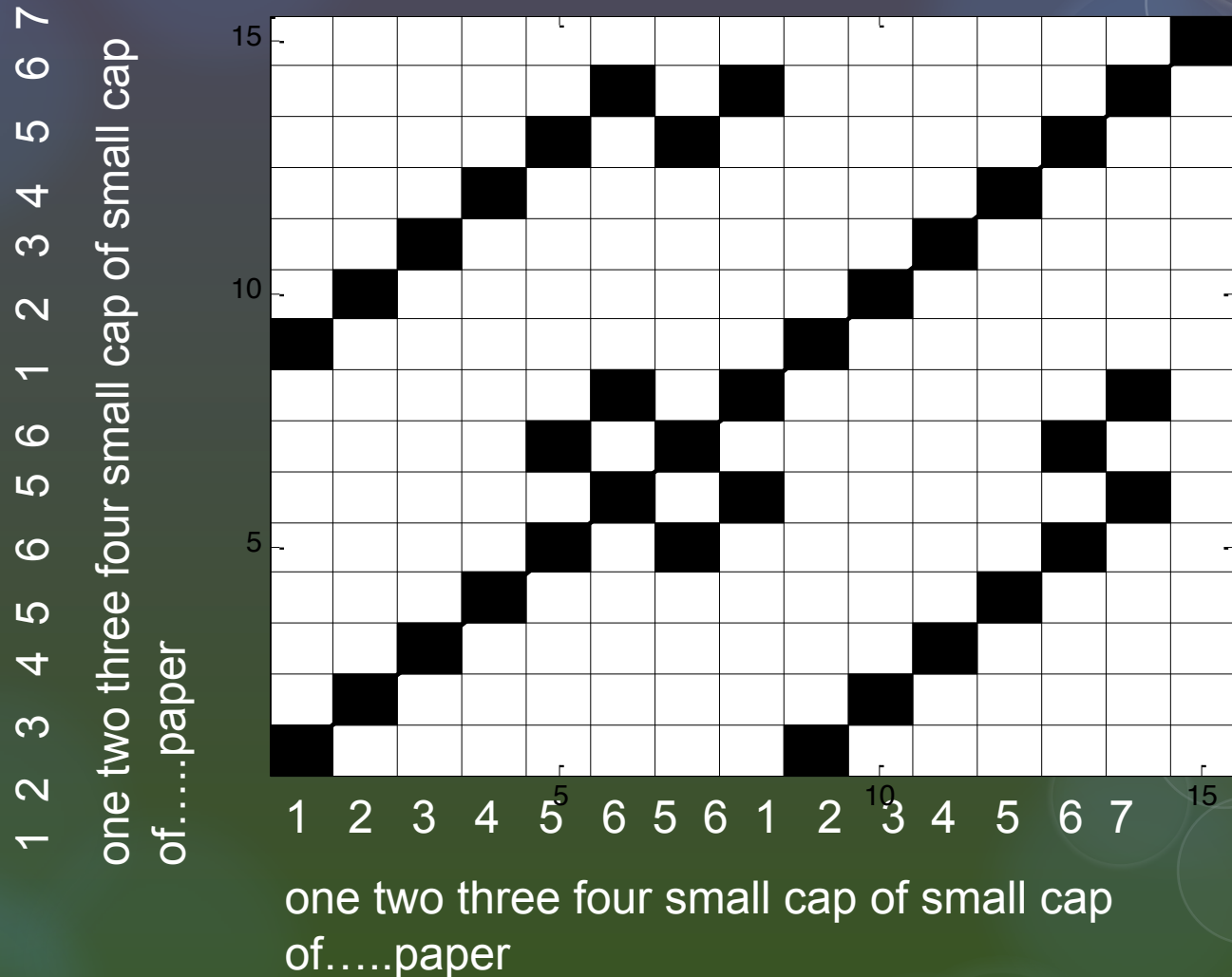
# Recurrence Quantification Analysis

- Recurrence rate (RR)
  - being or doing the same earlier, later or at the same time
  - indicated by % of recurring points in a Recurrence Plot
- Determinism (DET)
  - being or doing the same over a period of time
  - indicated by % of recurrence points forming a diagonal line

# ARQA

RR = 15.6%; DET = 100% or 77%

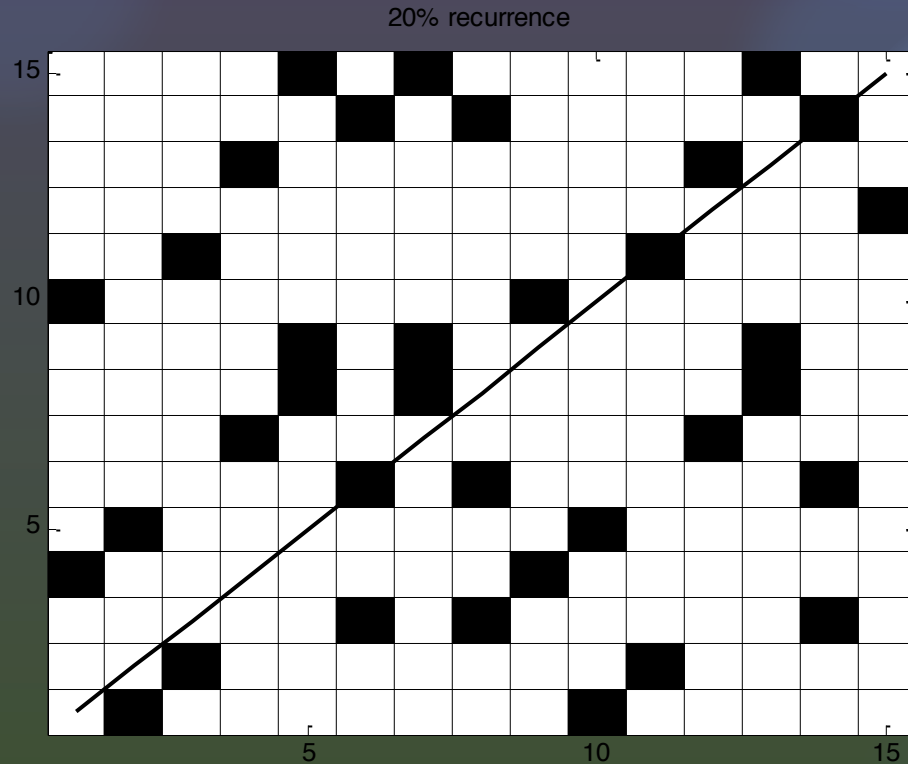
20% recurrence



# ARQA

RR = 15.6%; DET = 37% or 8.6%

Shuffled time series

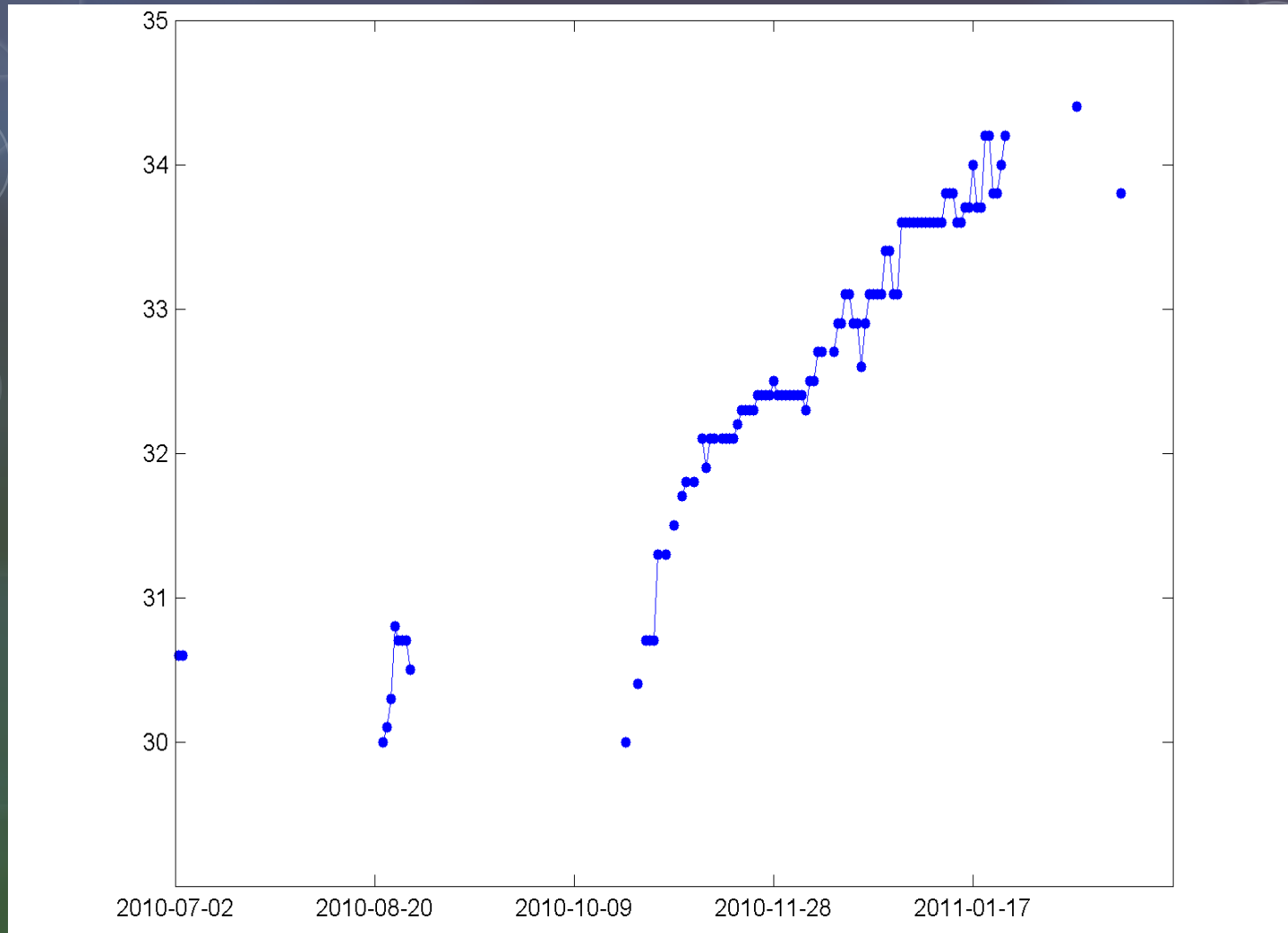


1 2 3 4 5 6 5 6 1 2 3 4 5 6 7

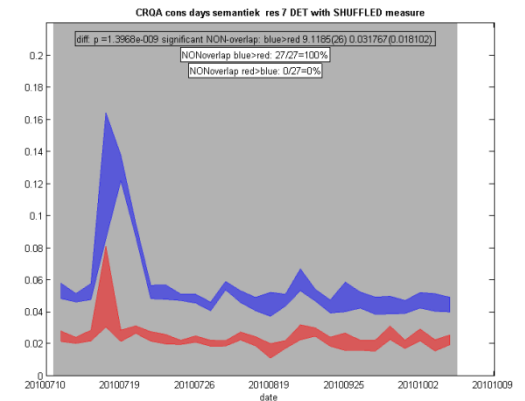
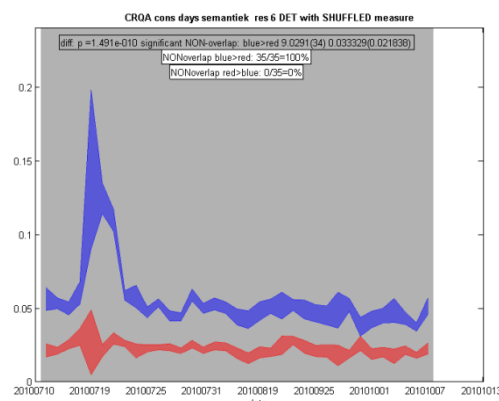
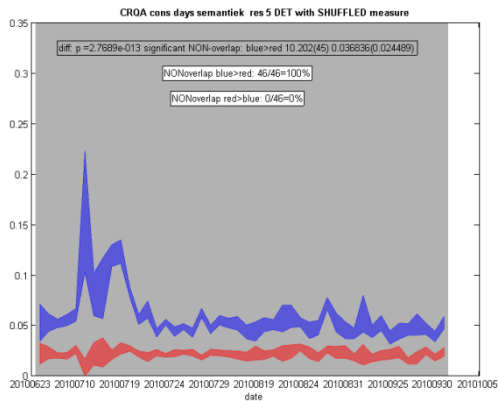
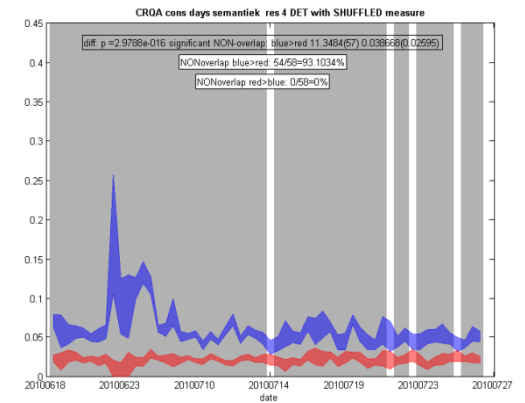
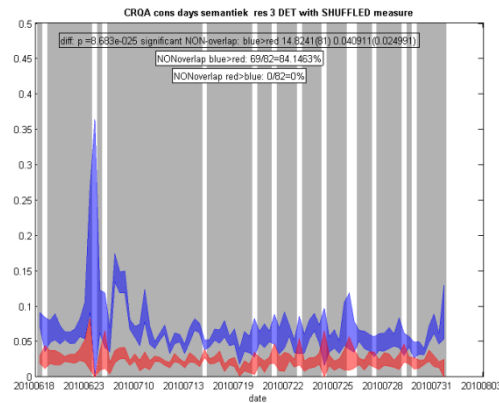
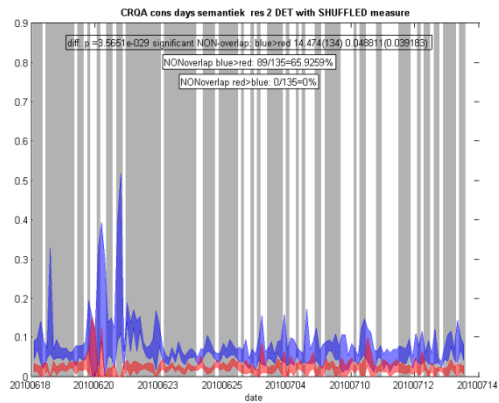
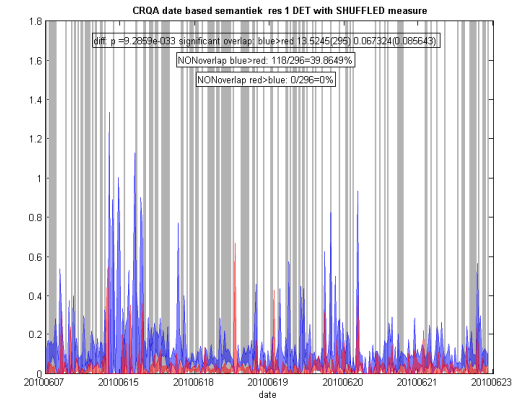
one two three four small cap of small cap  
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# Weight development



# DET in CRQA



# A-Recurrence and Determinism

	Recurrence Rate			Determinism	
Res	Data points	Difference Client-Therap	<i>R</i> Client-Therap	Difference Client-Therap	<i>R</i> Client-Therap
1	296	<b>.20</b>	<b>.23</b>	<b>2.00</b>	<b>.13</b>
2	135	<b>.18</b>	<b>.30</b>	<b>1.89</b>	<b>.35</b>
3	82	<b>.16</b>	<b>.58</b>	<b>1.56</b>	<b>.54</b>
4	58	<b>.15</b>	<b>.66</b>	<b>0.82</b>	<b>.58</b>
5	46	<b>.16</b>	<b>.66</b>	<b>1.14</b>	<b>.69</b>
6	35	<b>.14</b>	<b>.75</b>	<b>0.87</b>	<b>.85</b>
7	27	<b>.16</b>	<b>.82</b>	<b>0.78</b>	<b>.86</b>

\* All red figures represent significant values



# Leading and Following of Synchronous Behavior

- Usually shown by the pattern around the line of synchrony
- Problem in texts: no continuous interaction and times series differ in length
- Thus:

**Person A**

Hi! How are you?



**Person B**

I'm fine. How are you?

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**Person A**

**Person B**

3

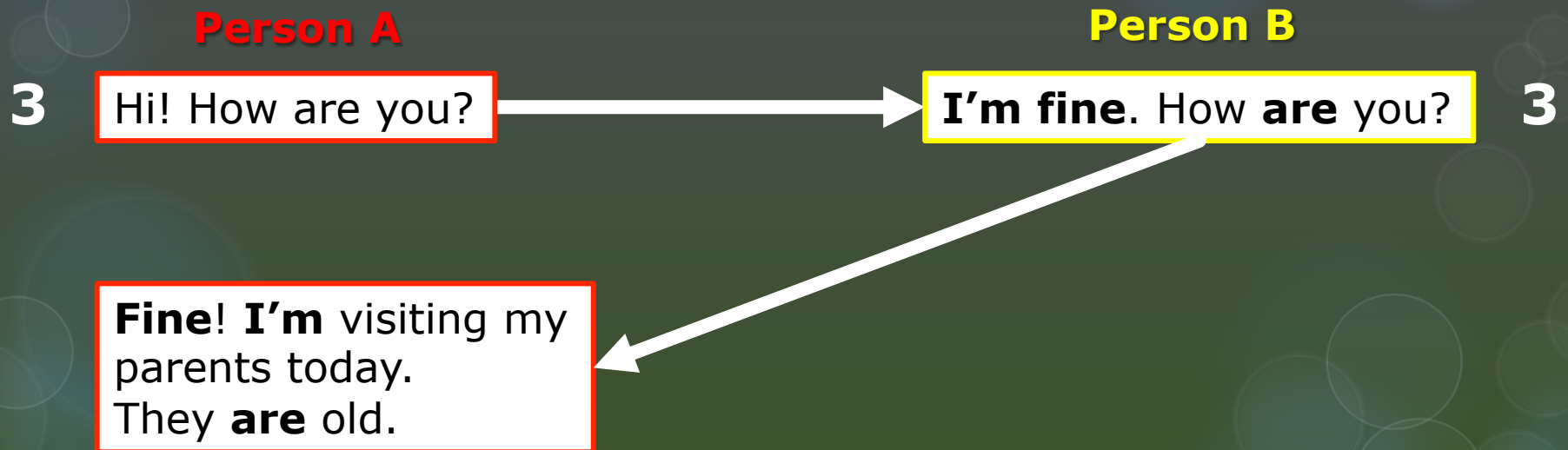
Hi! How are you?

I'm fine. How are you?

Fine! I'm visiting my  
parents today.  
They are old.

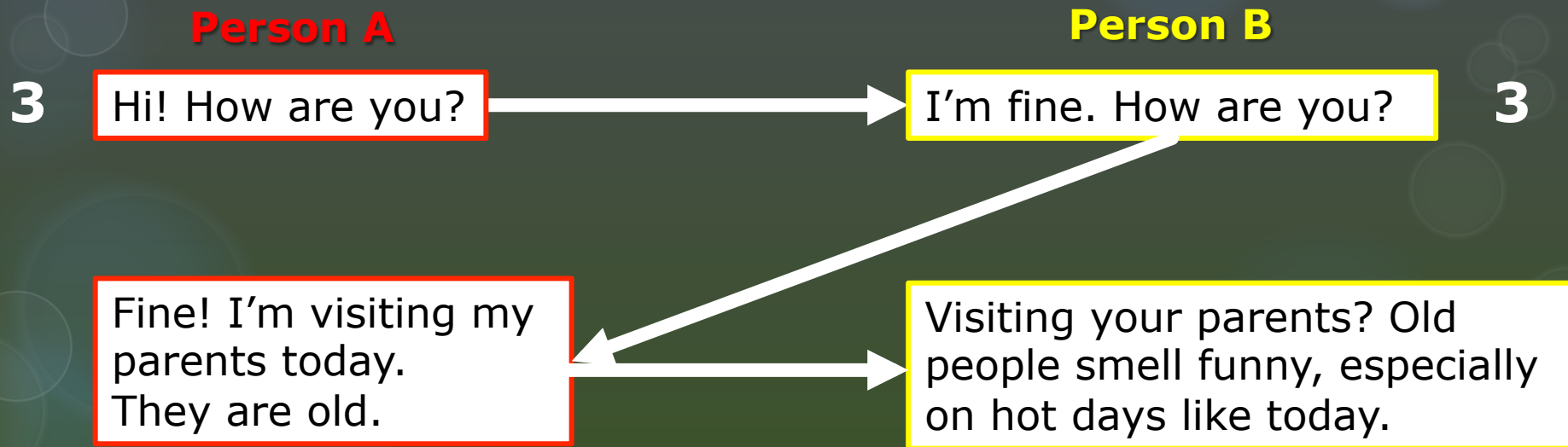
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**Person A**

**Person B**

**3**

Hi! How are you?

**3**

I'm fine. How are you?

**4**

Fine! I'm **visiting** my **parents today**.  
They are **old**.

**Visiting** your **parents**? **Old**  
people smell funny, especially  
on hot days like **today**.

# Synchronization \* Weight

	ARQA					CRQA			Linell
	Client		Therapist						
Res	RR	DET	RR	DET		RR	DET	Difference in % leading	IR-diff
	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>		<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>
1	n.s.	n.s.		n.s.		<b>-.43</b>	n.s.	<b>-.40</b>	<b>-.46</b>
2	<b>-.54</b>	n.s.	n.s.	n.s.		<b>-.48</b>	<b>-.49</b>	<b>-.50</b>	<b>-.51</b>
3	<b>-.71</b>	<b>-.55</b>	n.s.	n.s.		<b>-.62</b>	<b>-.63</b>	<b>-.60</b>	<b>-.62</b>
4	<b>-.72</b>	<b>-.64</b>	n.s.	n.s.		<b>-.66</b>	<b>-.66</b>	<b>-.71</b>	<b>-.49</b>
5	n.s.	n.s.	n.s.	<b>-.70*</b>		n.s.	<b>-.72</b>	<b>-.74</b>	n.s.
6	n.s.	n.s.	n.s.	n.s.		n.s.	<b>-.82</b>	<b>-.77</b>	n.s.
7	n.s.	<b>-.82</b>	n.s.	n.s.		n.s.	<b>-.83</b>	<b>-.83</b>	n.s.

\* All red figures represent significant values

# Conclusions

- Higher levels of cross-recurrent behaviour correlated negatively with weight gain
- Why?
  - Adaptability of the client's system is low
  - Cross-recurrence reflects the therapist tuning in
  - Gradually detuning, while staying in touch (coupled) appears to be key to therapeutic change

# Epilogue

What we showed is not just a therapeutic attitude on top of which the “real” intervention is brought into action,

it **IS** the therapeutic intervention