DFG Priority Program
MEDIATIZED WORLDS

Audio Communication Group
Fachgebiet Audiokommunikation

Buildup, Breakdown and Drop

An initial experimental approach for explaining the emotional impact of DJ performances in Electronic Dance Music (EDM)

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Theory

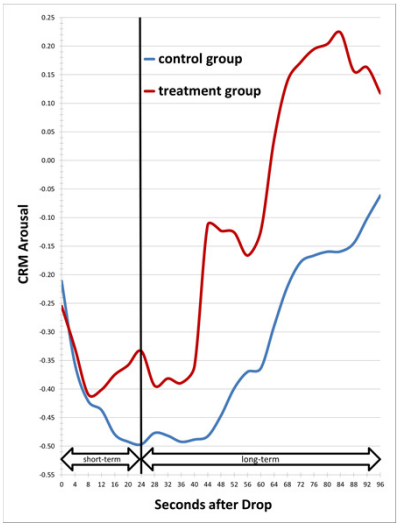
- **Phenomenon of "Buildups", "Breakdowns" and "Drops" in EDM**
  - ***"buildup"***
    continually layering of musical structure in regular 2, 4, 6, 8, 16, 32 bar pattern parts
  - ***"breakdown":***
    end pattern (2+patt.) with reduced instrumentation,no bass drum, and silence at end
  - ***"drop":***
    return of base drum and/or core musical theme
  - **Common DJ strategy:**
    Surprising prolongation of breakdown by use of filters, loops and Equalizers
    → often experienced as very emotional – but why?

- **Adoption to Contrastive valence theory (Huron 2006)**
  - Disappointment regarding anticipated drop produces (negative/arousing) stress reaction
  - Release of endorphins: long-term time increase in positive valence

- **Research Hypotheses:**
  - "too late drop" → short-term increase / long-term increase in listeners' felt arousal
  - "too late drop" → short-term decrease /long-term increase in listeners' positive valence

Techno DJ Jeff Mills at work in 2007 (Photo taken by Zoe, Seattle, USA, CC-License)

Results 1: CRM - Arousal



Linear Mixed Growth Curve Model "Arousal": Fixed Effects

Predictor	df	F-value	p
Intercept (baseline)	23.041	50.683	0.001***
Breakdown intercept	1180.297	3.298	0.070(*)
Short-term intercept	1176.975	5.713	0.017*
Long-term intercept	1177.643	41.181	0.001***
Time (baseline slope)	1176.947	26.342	0.001***
Time * Breakdown	1180.838	0.111	0.739
Time * Short-term (neg. slope)	1176.947	6.852	0.009**
Time * Long-term (pos. slope)	1176.947	21.429	0.001***
Treatment * Short-term	1177.992	1.220	0.270
Treatment * Long-term (elevated intercept)	1177.624	6.586	0.010*
Treatment * Time * Short-term	1176.947	1.376	0.241
Treatment * Time * Long-term (inc. slope)	1176.947	4.262	0.039

Linear Mixed Growth Curve Model "Arousal": Random Effects

Parameter		Est.	SE	Wald-Z	p
Residuum		0.100	0.004	24.258	0.001***
Intercept [Subject]	Variance	0.076	0.027	2.852	0.004**

Methods

- **Subjects**
  - 18 participants (23-30y) with a personal preference for EDM
- **Treatment**
  - EDM Audio-Track: "Chardronnet vs. Afrilounge: Shake it!" (7:03m)
  - *Control Stimulus:* Original Track
  - *Treatment Stimulus:* Original Track with prolonged (doubled) 2nd breakdown after 268s
- **Measurement**
  - Emujoy-Application (Nagel et al. 2007)
  - JAVA-based 2-dimensional (arousal / valence) CRM-software
- **Procedure**
  - Questionnaire overall and club music consumption
  - Assignment to treatment groups on basis of questionnaire data
  - Subjects listened via headphones and had to continuously rate their feelings
  - Initial listening to a training audio track, afterwards either treatment or control
- **Analysis**
  - Downsampling of CRM-data (1 Sample / 4 seconds) to remove higher order autocorrelations
  - Analysis of arousal/valence data regarding 2nd breakdown (taking 1:44m before as baseline measurement)
  - 2 LMM Growth Curve Fittings (L1 - Subject, L2 - Time, AR1 residuals, timeslope & effect-dummys)
  - Explorative selection of time frames for short-term / long-term effects

Discussion

- **Treatment Effects on Arousal**
  - Elevated long-term intercept: Due to longer increase in arousal during breakdown (disapp.)
  - Increase in long-term slope: Release of endorphines according to Contrastive Valence Theory
    → contrastive reaction (unexpectedly) exhibits ~ 24s latency

- **Treatment Effects on Valence**
  - Lowered long-term intercept: Due to longer decrease in valence during breakdown (disapp.)
  - Increase in long-term slope: Release of endorphines according to Contrastive Valence Theory
    → contrastive reaction (unexpectedly) exhibits ~ 24s latency

- **General Discussion**
  - **Contrastive Valence Theory applicable to DJ techniques in EDM!**
  - **Long latency explainable through translation from ANS to CRM and formal features of the track**
  - **Anticipation of formal structural parts important device of affective musical experience in EDM**
  - **EDM music suitable for neuropsychological experiments with expectation related paradigms**
  - **Further explorations of EDM-specific question regarding music and emotions (Bass, Groove)?**

- **Outlook**
  - Replication of results with employing ANS-measurements
  - Replication of results with employing "true" DJ techniques and with different EDM tracks

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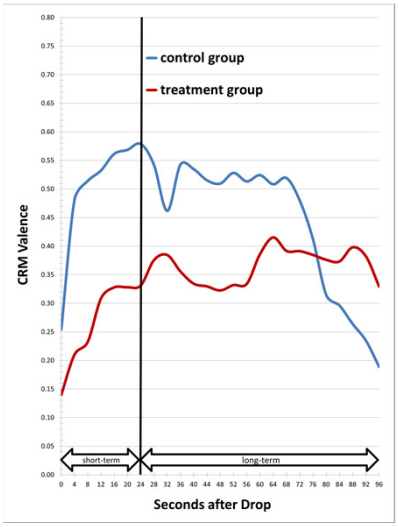
Results 2: CRM - Valence



Linear Mixed Growth Curve Model "Valence": Fixed Effects

Predictor	df	F-value	p
Intercept (baseline)	46.941	23.993	0.001***
Breakdown Intercept	303.021	3.459	0.064(*)
Short-term Intercept	512.590	13.114	0.001***
Long-term Intercept	144.799	18.477	0.001***
Time (baseline slope)	101.058	4.192	0.043*
Time * Breakdown (neg. slope)	280.171	3.582	0.059(*)
Time * Short-term (pos. slope)	421.719	15.336	0.001***
Time * Long-term (neg. slope)	92.625	6.982	0.010*
Treatment * Short-term	612.056	0.020	0.887
Treatment * Long-Term (lowered intercept)	277.149	4.264	0.040*
Treatment * Time * Short-term	500.396	0.824	0.364
Treatment * Time * Long-Term (incr. slope)	190.416	5.125	0.025*

Linear Mixed Growth Curve Model "Valence": Random Effects

Parameter		Est.	SE	Wald-Z	p
Repeated Measures	AR1.diagonal	0.101	0.024	4.659	0.001***
	AR1.Rho	0.933	0.014	64.687	0.001***
Intercept [Subj.]	Variance	0.056	0.033	1.682	0.093(*)