

# Global Forum on Nicotine 2017

## **“Cigalikes versus Tank Systems: Effects on Smoking Reduction, Self-Reported Satisfaction, Craving and Withdrawal Relief at the Early Stage of a Quit Attempt”**

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# Disclosures

- This study was fully funded by a UEL PhD studentship to the first author
- No tobacco industry, electronic cigarette company or pharmaceutical industry funding
- No COI

# Cigalikes Vs Tanks

- First ecigs poor nicotine delivery (Bullen et al., 2010; Eissenberg, 2010)
- Tanks more efficient than Cigalikes (Farsalinos et al., 2014)



- Recent studies using tanks found plasma nicotine levels matching tobacco cigarettes (TC) (Dawkins, Kimber et al., 2016; Ramôa et al., 2016)

# Puffing patterns

## Experienced Vs Naïve users

- Experienced users (Dawkins & Corcoran, 2014) & newer devices achieve higher nicotine plasma levels, craving relief and satisfaction (Farsalinos et al., 2015; Hajek et al., 2017; Vansickel & Eissenberg, 2013)
- Experienced users take longer puffs (Farsalinos, 2015)
- Naive users' puffing patterns increase over time thereby increasing blood nicotine levels (Lee, Gawron & Goniewicz, 2015; Hajek et al., )
- “E-cigarette use: a learning curve” (McQueen, 2011)



# Nicotine concentrations

- Higher nicotine concentrations associated with greater craving relief & satisfaction (Etter, 2015), & higher plasma nicotine (Dawkins, Kimber et al, 2016)
- Ecig naïve smokers had to increase their nicotine concentrations to achieve abstinence (Farsalinos et al., 2013)

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ORIGINAL INVESTIGATION

## Self-titration by experienced e-cigarette users: blood nicotine delivery and subjective effects

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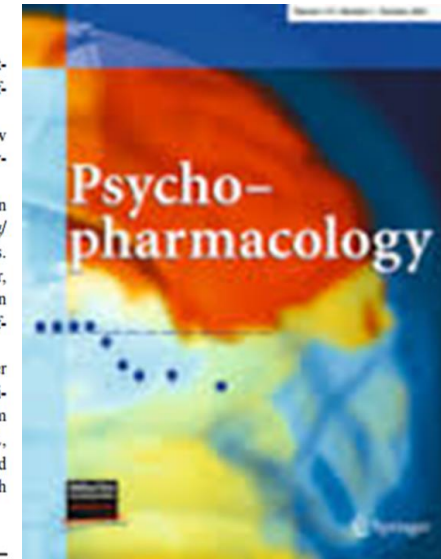
### Abstract

**Rationale** Self-titration is well documented in the tobacco literature. The extent to which e-cigarette users (vapers) self-titrate is unknown.

**Objective** This study explored the effects of high and low nicotine strength liquid on puffing topography, nicotine delivery and subjective effects in experienced vapers.

**Methods** Eleven experienced male vapers completed 60 min of ad libitum vaping under low (6 mg/mL) and high (24 mg/mL) nicotine liquid conditions in two separate sessions. Measurements included puffing topography (puff number, puff duration, volume of liquid consumed) and changes in plasma nicotine levels, craving, withdrawal symptoms, self-reported hit, satisfaction and adverse effects.

**Results** Liquid consumption and puff number were higher and puff duration longer, in the low nicotine strength condition (all  $ps < 0.01$ ). The mean difference in nicotine boost from baseline in the low condition was 8.59 (7.52) ng/mL, 16.99 (11.72) ng/mL and 22.03 (16.19) ng/mL at 10, 30 and 60 min, respectively. Corresponding values for the high



# Rationale

- Although cigalikes use prevalence is in decline (ASH, 2017), cigarette-like appearance appeal to ecig-naïve smokers wanting to quit (Dawkins, Kimber et al, 2015)
  - 28% of smokers would try again “*if it felt like smoking*” (ASH, 2017)
- EU-TPD cap on nic concentrations (20mg/mL)
  - 6 % vapers use 20 mg/mL (ASH, 2017)
  - What about **Smokers** ??

➤ **Nicotine concentrations**

➤ **Device types**




➤ **Frequency of use**

# Primary aims

To compare cigalikes VS tank systems

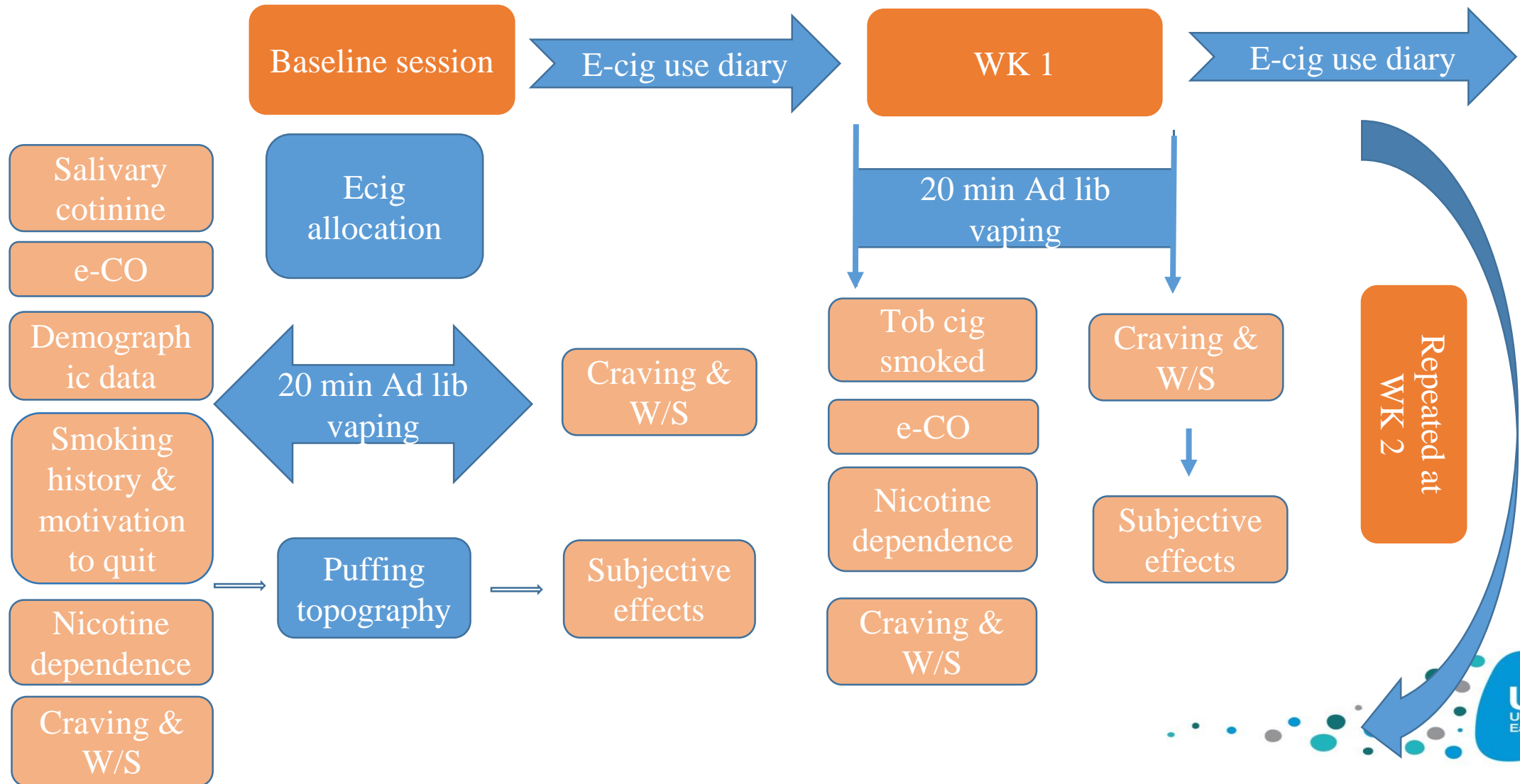
1. Effect on smoking behaviours (CPD & CO; Nicotine dependence)
2. Effect on craving & satisfaction & subjective effects
3. Effects of frequency of use on smoking (daily puff number)
4. How puffing patterns differ between devices and nicotine concentrations

# Methods: Group allocation

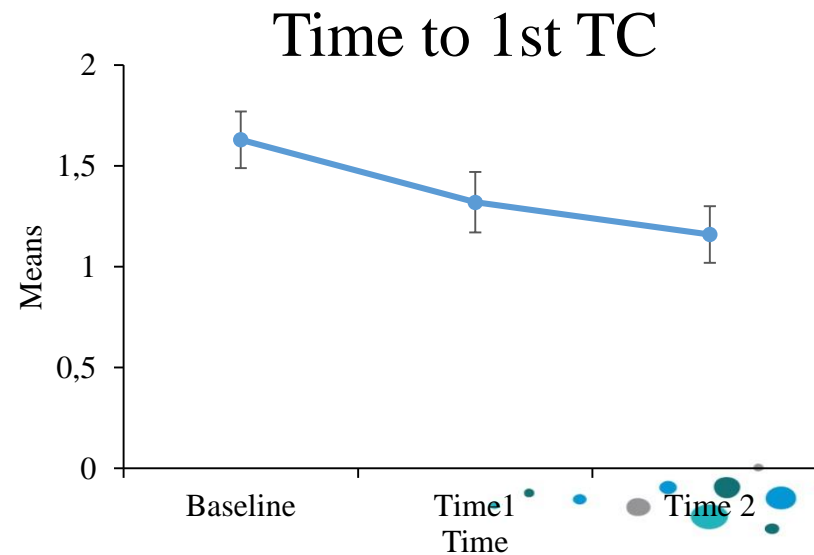
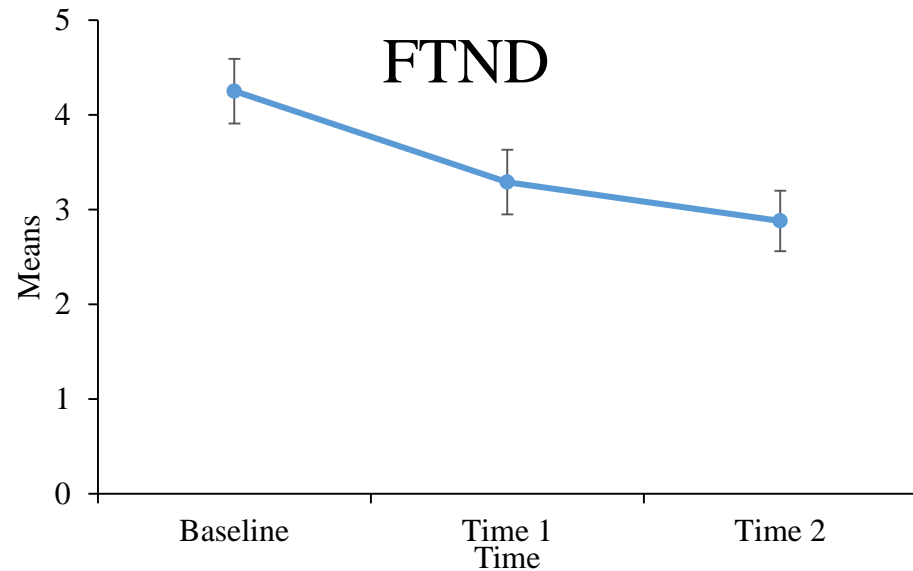
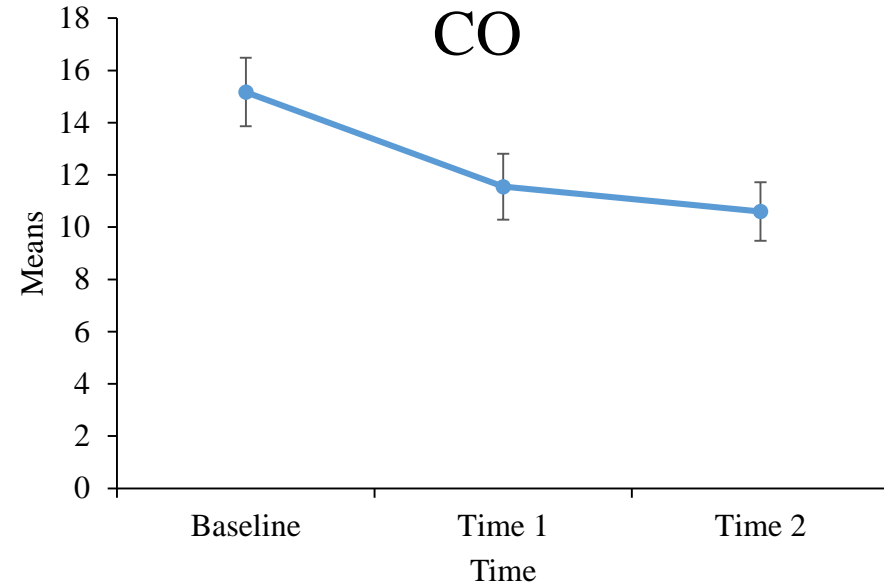
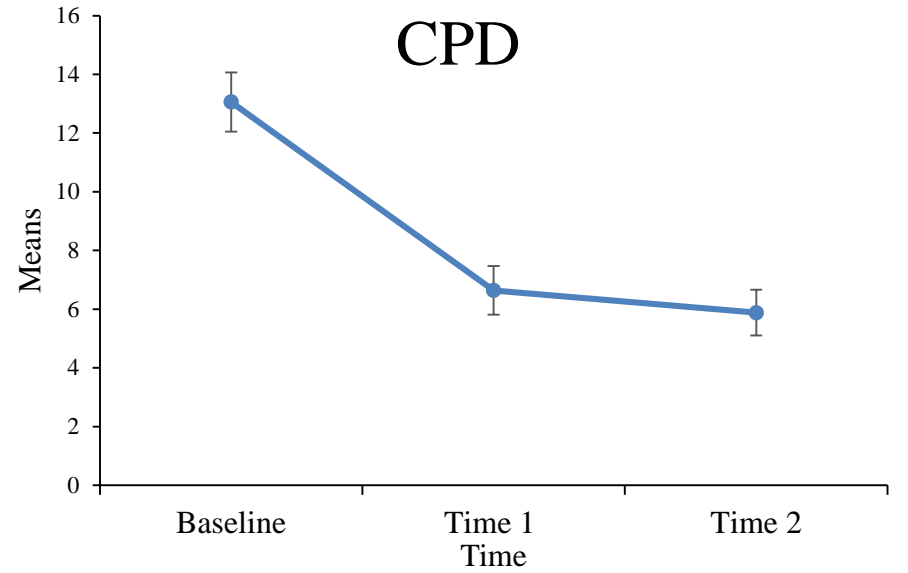
	N	Percentage	Mean±SD
<b>Whole sample</b>	70	-	-
<b>Gender (Female)</b>	-	62.9	-
<b>Age</b>	-	-	29.47±9.19
<b>Cigalikes (18 mg/mL)</b>	24	-	-
TECC Go eCig 	11	-	-
Blu eCig 	13	-	-
<b>6 mg/mL tank (TW mini curve – Red label 50/50 PG/VG) (Tank 6)</b>	23	-	-
<b>18 mg/mL tank (TW mini curve – Red label 50/50 PG/VG) (Tank 18)</b> 	23	-	-



# Methods: Study protocol

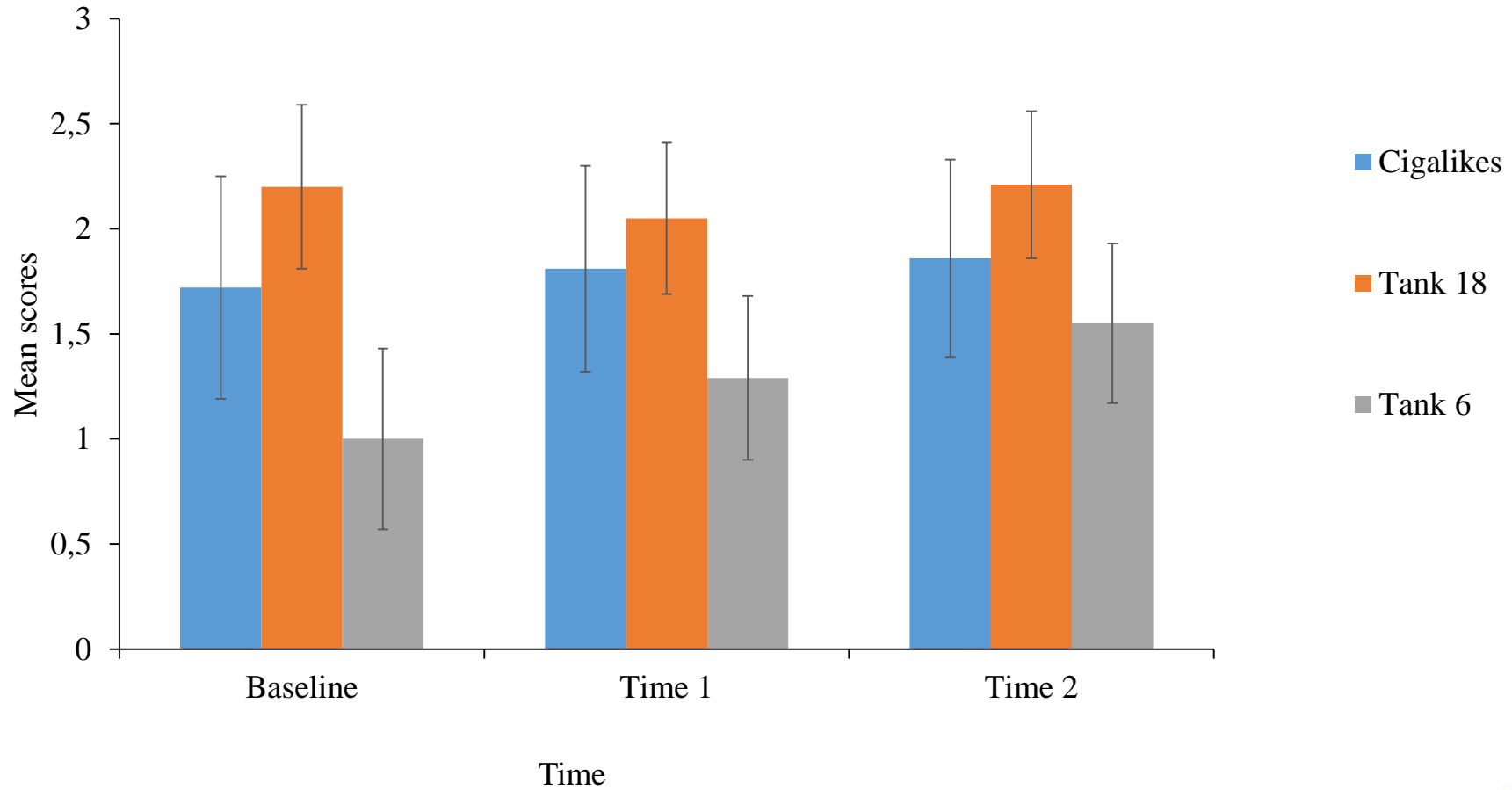


# Smoking reduction and Nicotine dependence



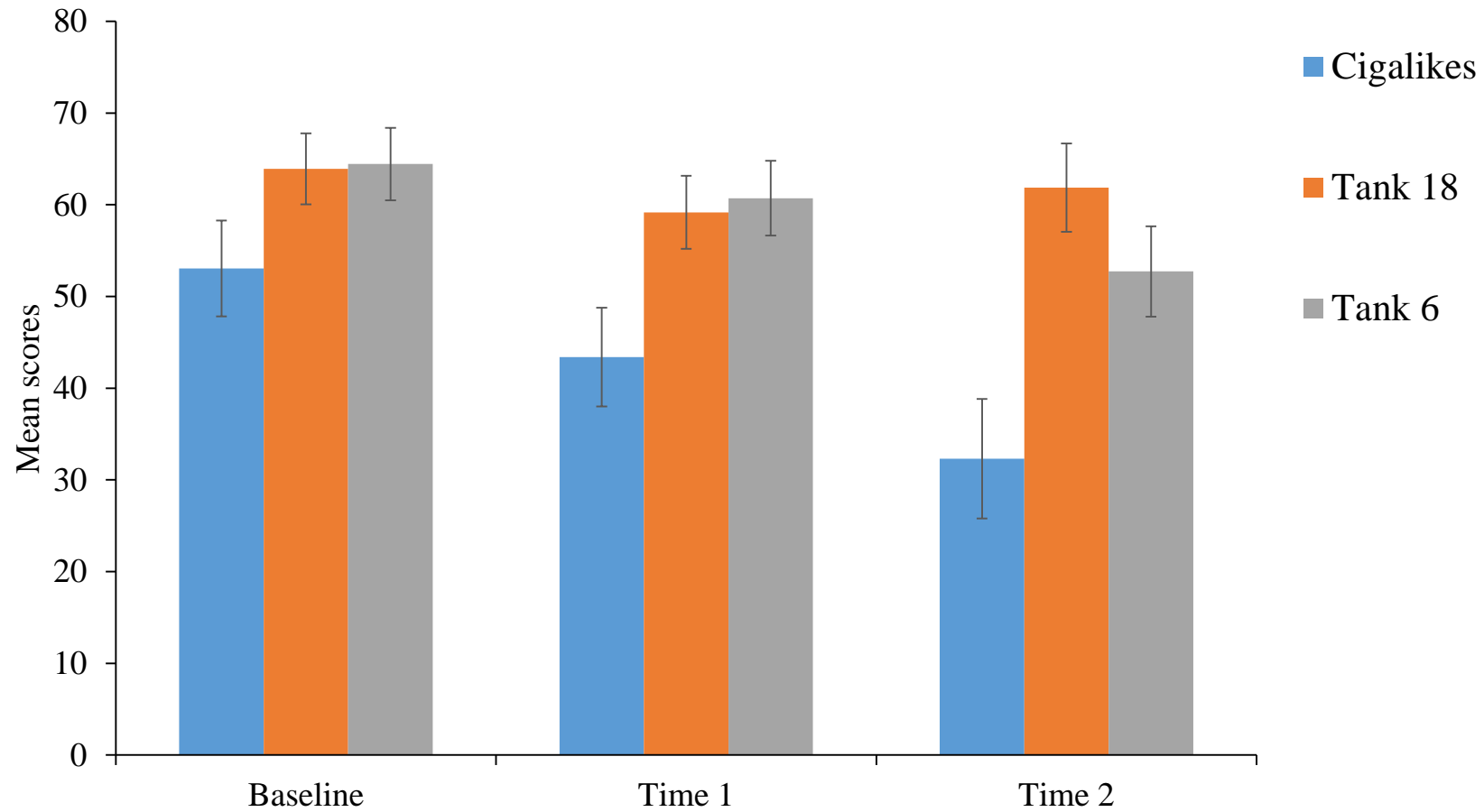
# Craving

Craving at baseline, Time 1 & 2



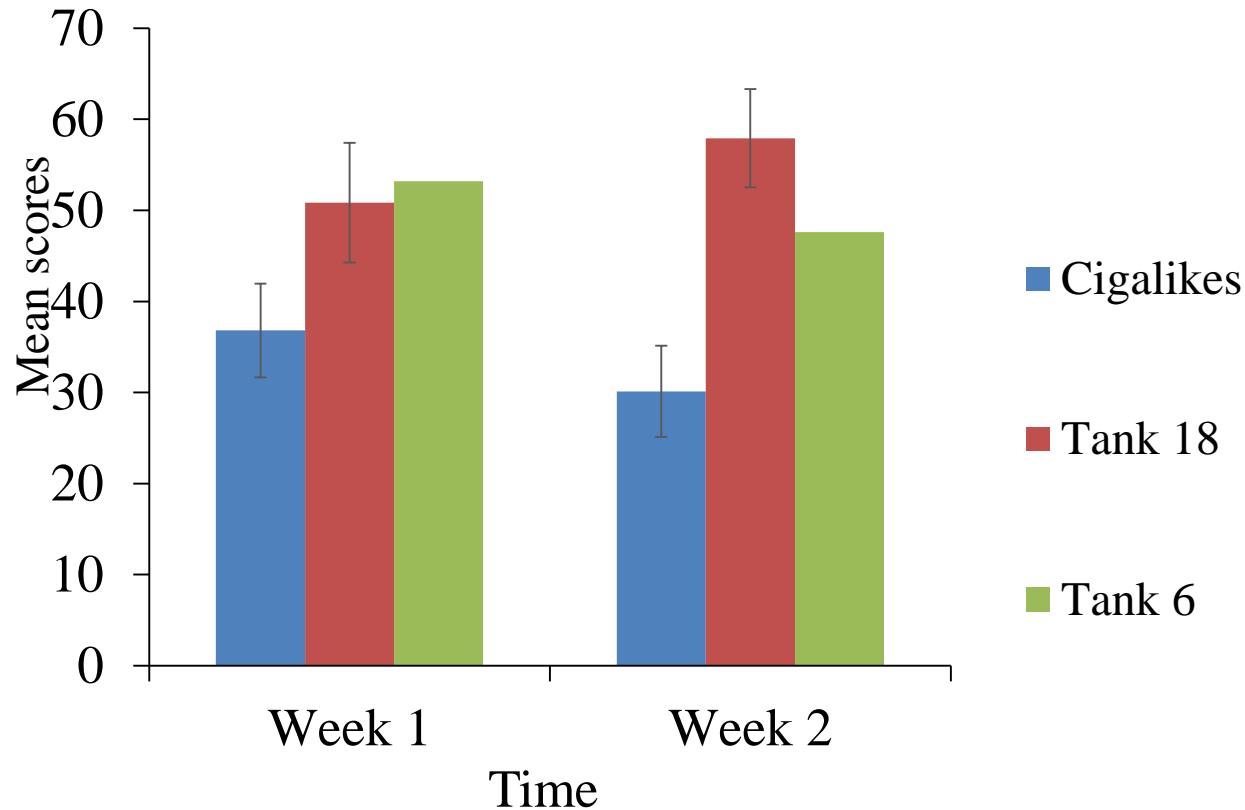
# Subjective effects

Satisfaction at baseline, week 1 & 2

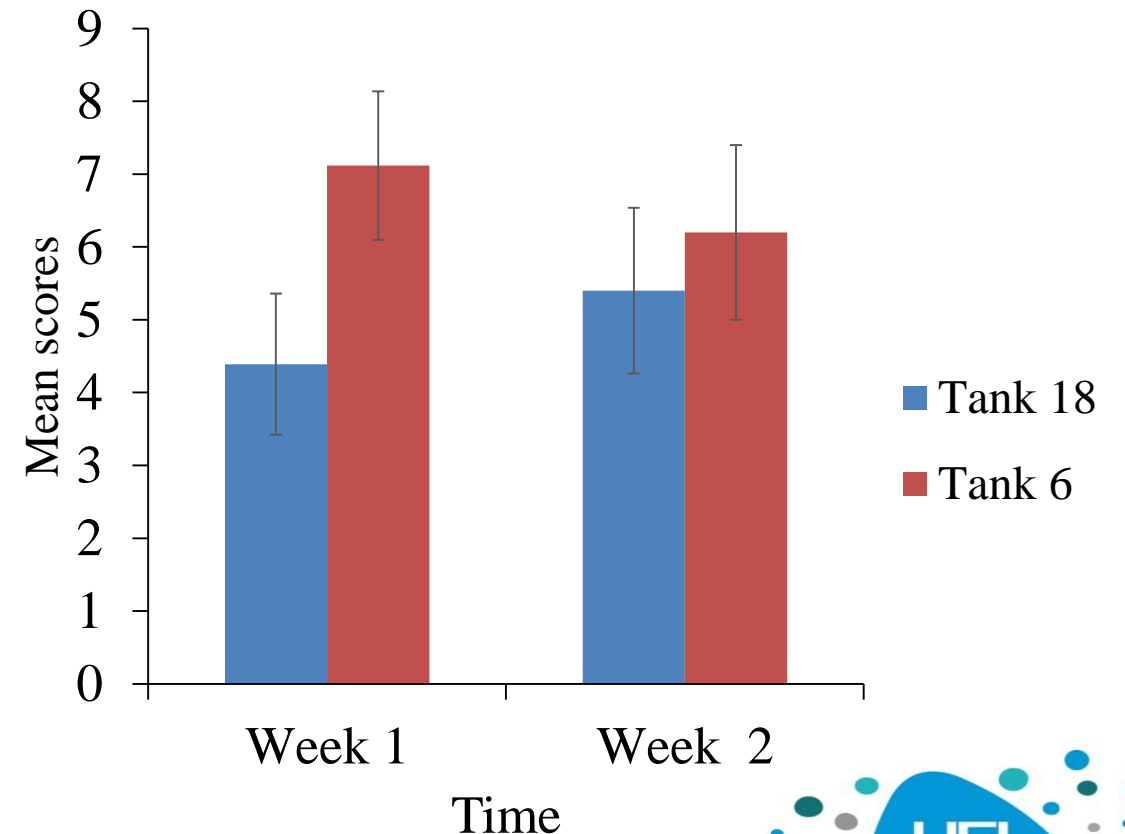


# Daily subjective effects and number of puffs

## Daily satisfaction at week 1 and 2



## Volume consumed in tanks



# Smoking reduction, puffing patterns & subjective effects at week 1

	CO	CPD	Puff number	Satisfaction	Pleasant	Reduced Craving	Hit
CO		.659**	-.348	-.294*	-.089	-.405**	-.397**
CPD			-.176	-.451**	-.326*	-.567**	-.458**
Puff number				.331*	.229	.220	.298*
Satisfaction					.796**	.709**	.683**
Pleasant						.507**	.518**
Reduced Craving							.731**

\* Correlations significant at  $p < .05$  (2 tailed)

\*\* Correlations significant at  $p < .01$  (2 tailed)

# Smoking reduction, puffing patterns & subjective effects at week 2

	CO	CPD	Puff number	Satisfaction	Pleasant	Reduced Craving	Hit
CO		.682**	-.287	-.318*	-.203	-.324*	-.218
CPD			-.241	-.358*	-.226	-.394**	-.240
Puff number				.517**	.540**	.613**	.550**
Satisfaction					.860**	.844**	.912**
Pleasant						.681**	.822**
Reduced Craving							.896**

\* Correlations significant at  $p < .05$  (2 tailed)

\*\* Correlations significant at  $p < .01$  (2 tailed)

# Key findings summarised

- As measured by CPD & CO, smoking reduced over time regardless of device type
- Nicotine dependence reduced also
- For satisfaction, the 18 mg/mL generally performed better except at week 1 (6 mg/mL Tank)
- Cigalikes performed the poorest at all times
- Tank systems & higher nicotine concentrations tended to perform better for craving relief
- No difference between device types in terms of feel or taste like a TC
- Daily puffing patterns were associated with satisfaction & other subjective effects (diary data)



# Implications

- E-cigarettes can positively impact smoking behaviours
- Satisfaction promotes more frequent use so is therefore important
- Cigalikes do not *feel* or *taste like a TC* ⇒ usefulness?
- Impact of EU-TPD cap on nicotine concentrations for smokers?

# Acknowledgements

➤ Participants

➤ Dr Kirstie Soar <sup>1</sup>



➤ Dr Lynne Dawkins <sup>2</sup>



➤ Prof. Olivia Corcoran<sup>3</sup>

➤ UEL DAB-RG



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