

Behavioral Economic Demand for Cannabis: A Preliminary Extension to High Potency Concentrates



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Background

- Concentrated cannabis (hash, resins, wax, etc.) sales are increasing at unprecedented levels and are 3-5x more potent than cannabis flower with 60-90% tetrahydrocannabinol (THC).²
 - Concentrates are understudied and the increase in potency may alter cannabis' reinforcing efficacy.
- The Marijuana Purchase Task (MPT) measures cannabis' reinforcing properties from a behavioral economics perspective gauging hypothetical use at increasing prices.¹
- Our goal was to examine whether MPT demand indices differ in users of high potency concentrates with frequent flower users and non-concentrate users.

Research Question: Do concentrate users display greater demand for cannabis compared to frequent flower users and non-concentrate users as measured by the MPT demand indices?

Methods

- Parent studies: 4 ongoing studies focused on cannabis
 - Ages 21-70 (mean = 30.78; SD = 12.2)
 - Must have used marijuana at least once recreationally.
 - Can be a daily tobacco smoker.
 - Cannot be using other drugs (cocaine, amphetamines, opiates).
 - Must not have a current or past psychotic or bipolar disorder.
- Experienced cannabis users (N=340, 55% male, mean concentrate use: 8.91 days/month, SD = 11.3) from Baseline data of parent studies.
 - Frequent Concentrate users** (FC, n=100): Concentrate use >4 days/week).
 - Frequent Flower users** (FF, n=182): Flower use >4 days/week, concentrate use 1-3 days/week.
 - Non-concentrate users** (NC, n=58): Flower use <4 days/week, concentrate use <1 day/month).
- Timeline Follow Back (TLFB)** survey asks about recreational drug use in past two weeks.³
- MPT**
 - How much cannabis someone consumes for 1 week at each increasing prices.
 - Five demand indices (created with R) for cannabis: Q_0 (consumption when free), O_{max} (maximum expenditure), P_{max} (price where consumption decreases), breakpoint (price where consumption ceases), α (rate of change in consumption).
 - Larger Q_0 , O_{max} , P_{max} , breakpoint means greater demand.**
 - Smaller α means greater demand.**
- ANOVA (done with SPSS) compared MPT outcomes (Q_0 , O_{max} , P_{max} , breakpoint, α) by group (NC, FF < FC). T-tests (done with Excel compared significance among groups.

Results

T1		Overall	FC	NC	p-Val	FF	p-Val
N		340	100	58		182	
Demographics	Gender	0.55	0.580	0.517	0.447	0.544	0.562
	Age	30.78	27.850	37.483	< 0.005	30.253	0.071
Cannabis Use	Days of Cannabis Flower Use	24.24	12.780	5.466	< 0.005	25.538	< 0.005
	Days of Cannabis Concentrate Use	8.91	25.460	0	< 0.005	2.648	< 0.005
	Days of Overall Cannabis Use	18.36	27.5	11.086	< 0.005	26.637	0.022

Table 1. Comparison of FC, NC, and FF users. p-Val meant to show difference between FC vs. NC & FC vs. FF

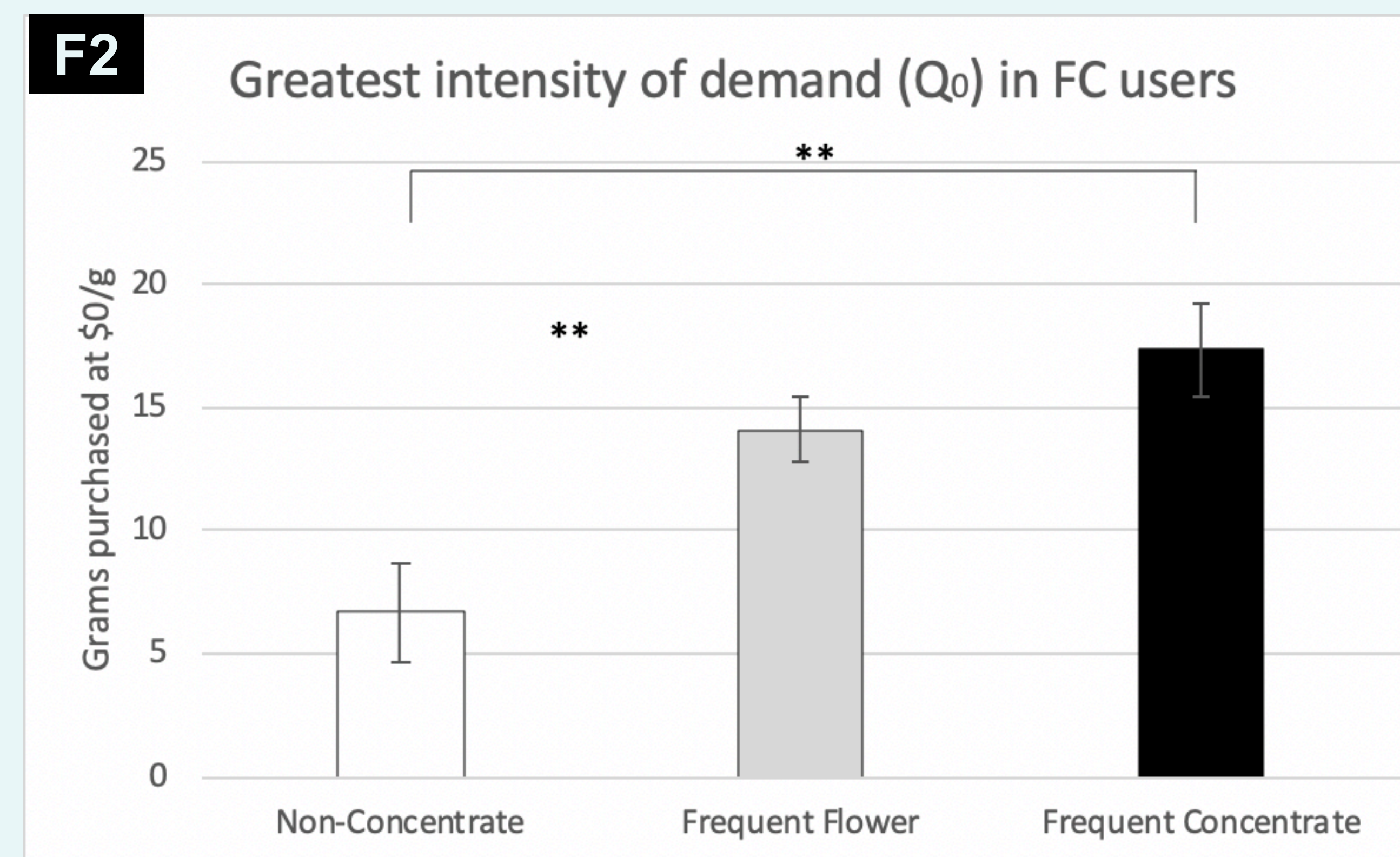


Figure 2. Average intensity for demand (how much purchased when price is \$0/g) of cannabis flower for NC, FF, and FC. FC had the greatest Q_0 (meaning greatest demand). ** denotes p-value of <.001 significance.

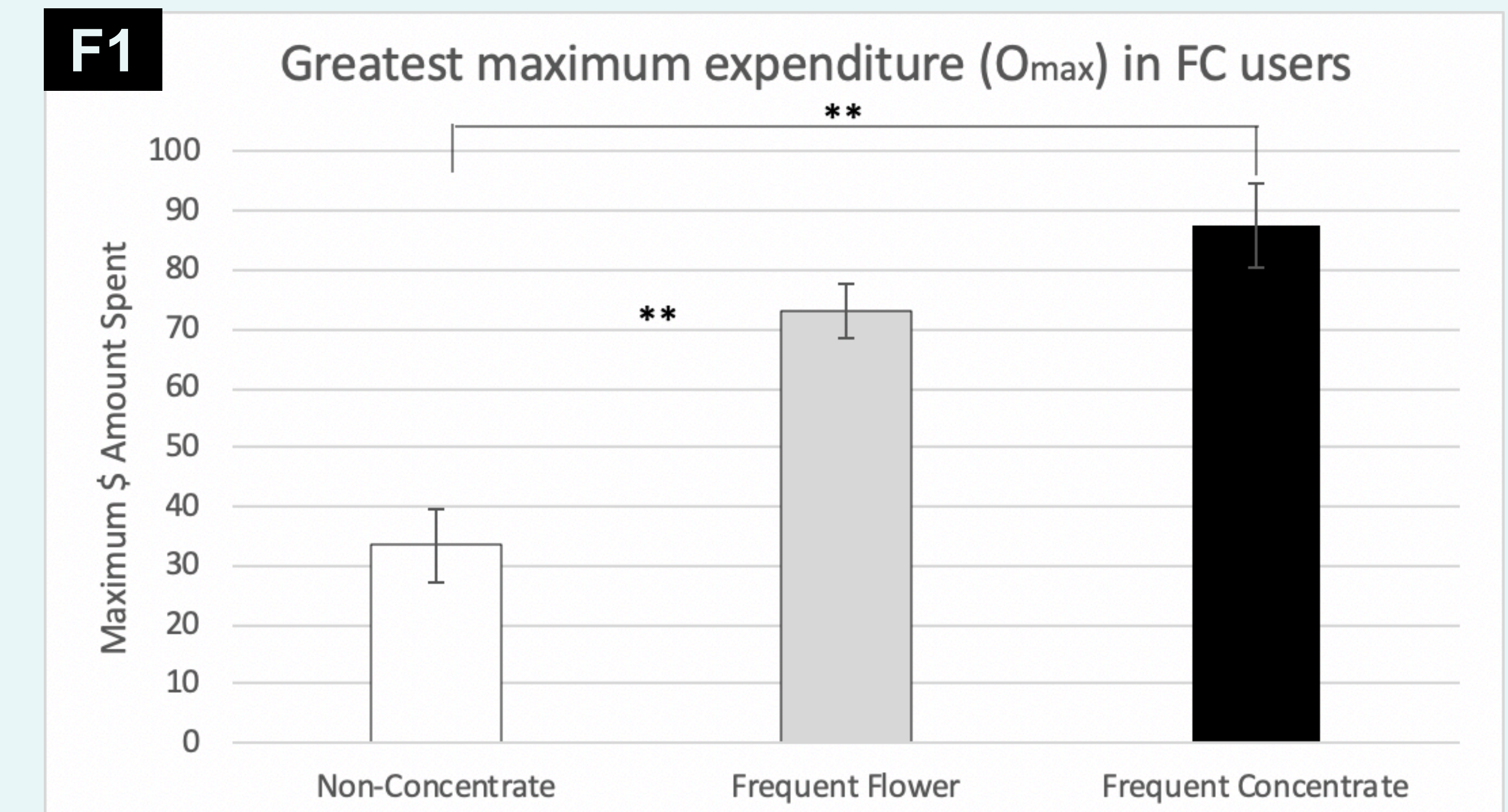


Figure 1. Average maximum expenditure of cannabis flower for NC, FF, and FC. FC had greatest O_{max} (meaning greatest demand). ** denotes p-value of <.001 significance.

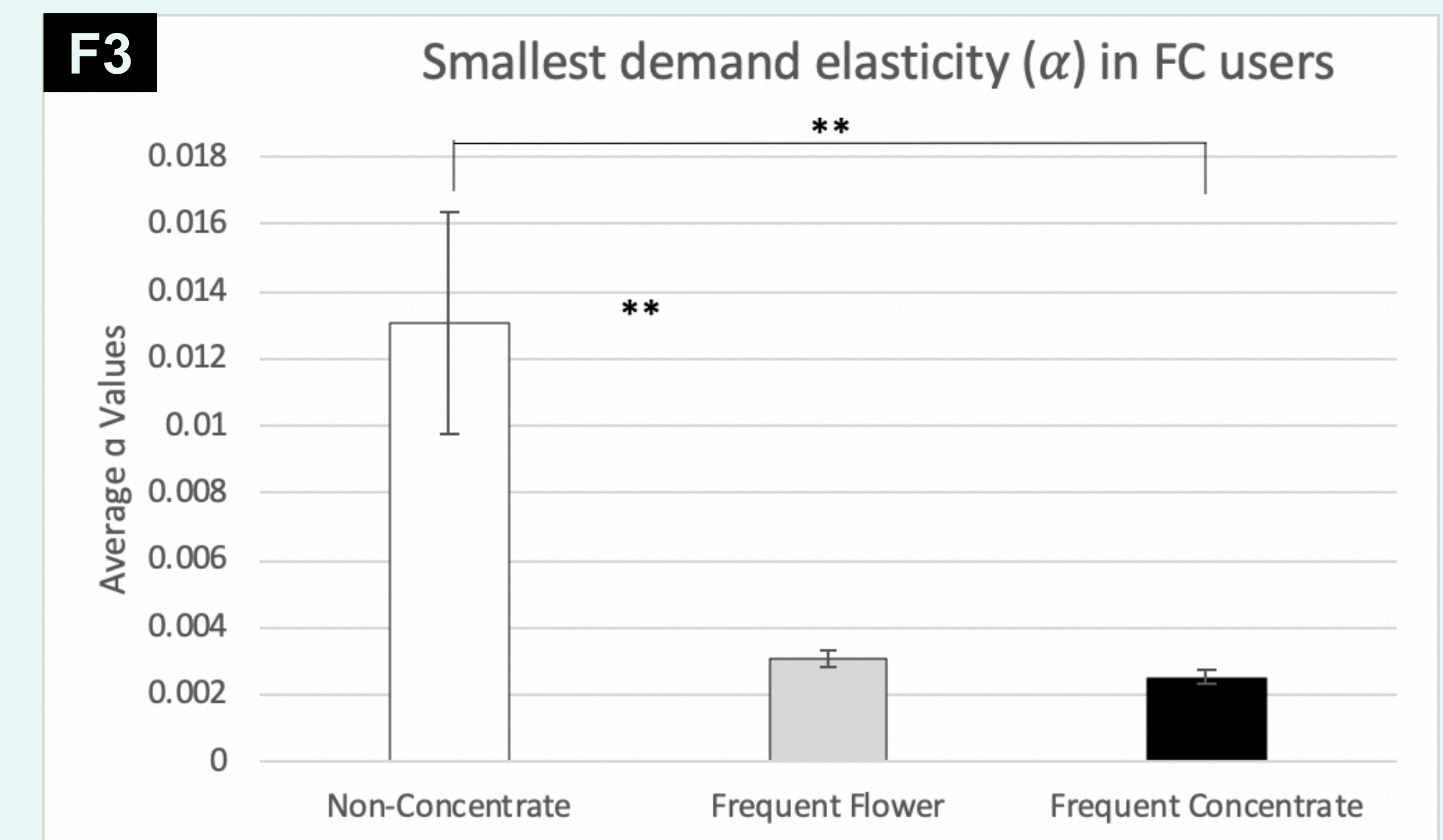


Figure 3. Average demand elasticity for cannabis flower for NC, FF, and FC. FC had the most inelastic demand (meaning greatest demand). For analysis alpha values were log-transformed but kept in original format for graph. Significance levels remained the same. ** denotes p-value of <.001 significance.

Discussion

- Intensity of demand (Q_0), maximum expenditure (O_{max}), and demand elasticity (α) differed by cannabis user group (ps < 0.001), with higher Q_0 , O_{max} , and lower α in FC users compared to NC (ps < 0.001) and FF users (at trend-levels). The number of overall cannabis use days modestly correlated to all demand indices (rs: 0.11-0.42, ps < 0.031).
- Frequent concentrate users indicated significantly greater demand for cannabis flower on the MPT compared to non-concentrate users and frequent flower users and at trend level (as indicated by higher Q_0 , higher O_{max} , and lower α) (Fig. 1,2,3).
- This indicates a relatively higher demand for cannabis among concentrate users and suggests the reinforcing properties of cannabis may vary as a function of frequent concentrate use and THC potency.
- Future analyses will determine if dependence symptoms interact with concentrate group on MPT indices.

References

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