

# The relationship between smoking and migraine frequency: The unusual role of locus of control

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## Introduction

- 14.2% of US adults are affected by migraine headaches (Burch, et al, 2015).
- Smoking rates are higher among chronic pain patients (Orhurhu et al., 2015)
- Smoking is a risk factor for chronic pain (Shi et a., 2010) and is related to greater levels of functional impairment among individuals with chronic pain (Goesling, et al, 2012).
- Smoking can directly influence pain experience (i.e., increased pain sensitivity due to nicotine withdrawal) and indirectly affect individuals' pain experience by decreasing self-efficacy and increasing external locus of control (Clarke, 1982; Shi et al., 2010) .
- One previous study suggested a relationship among locus of control, headache and depression (Heath et al, 2008), but studies specifically examining the role of locus of control in the relationship between smoking and migraines is lacking.

## Aims

- The present study examined the mediating effect of external locus of control on the relationship between smoking and frequency of chronic migraine among female migraineurs.
- This study hypothesizes that high levels of smoking predict external locus of control and external locus of control predicts high levels of migraine frequency among female chronic migraineurs.

## Methods

- Methods were approved by UC-D IRB; Consent was given prior to participation
- Participants were 2,000 adult, US-based, female participants who were medically diagnosed with chronic migraine.
- Participants completed a 30-minute online self-report-survey during the spring of 2015 on a well known online migraine headache website.
- 27% of participants were 18-39 years old, 62% were 40-54 years old, and 10% were older than 60 years.
- Locus of Control: Participants were asked to rate the following statements (i.e., migraines control my life vs. I am in control of my life despite of my migraines) on 7 point scales from 1 (completely disagree) to 7 (completely agree).
- If participants endorsed strongly agree (6), to strongly disagree (1) to the statement "I control my life in spite of migraine", they will be assigned into "Migraine-control" (external locus of control group). The opposite is true for "I-control" (internal locus of control group).

## Results

Table 1. Correlations between smoking and other variables

	Smoking	Migraine freq	LOC	N-Life Impact	#MH issues	#PH issues
Smoking	1	.049*	-.068**	.082**	.086**	-.001
Migraine freq		1	-.506**	.508**	.201**	.177**
LOC			1	-.713**	-.293**	-.209**
N-Life Impact				1	.340**	.202**
#MH issues					1	.394**

Note: Migraine frequency=# migraines/month, LOC=locus of control status (0=external LOC, 1=Internal LOC, N-Life impact: negative life impact, #MH issues=mental health issues, #PH issues=physical health issues. \*p<.05, \*\*p<.01

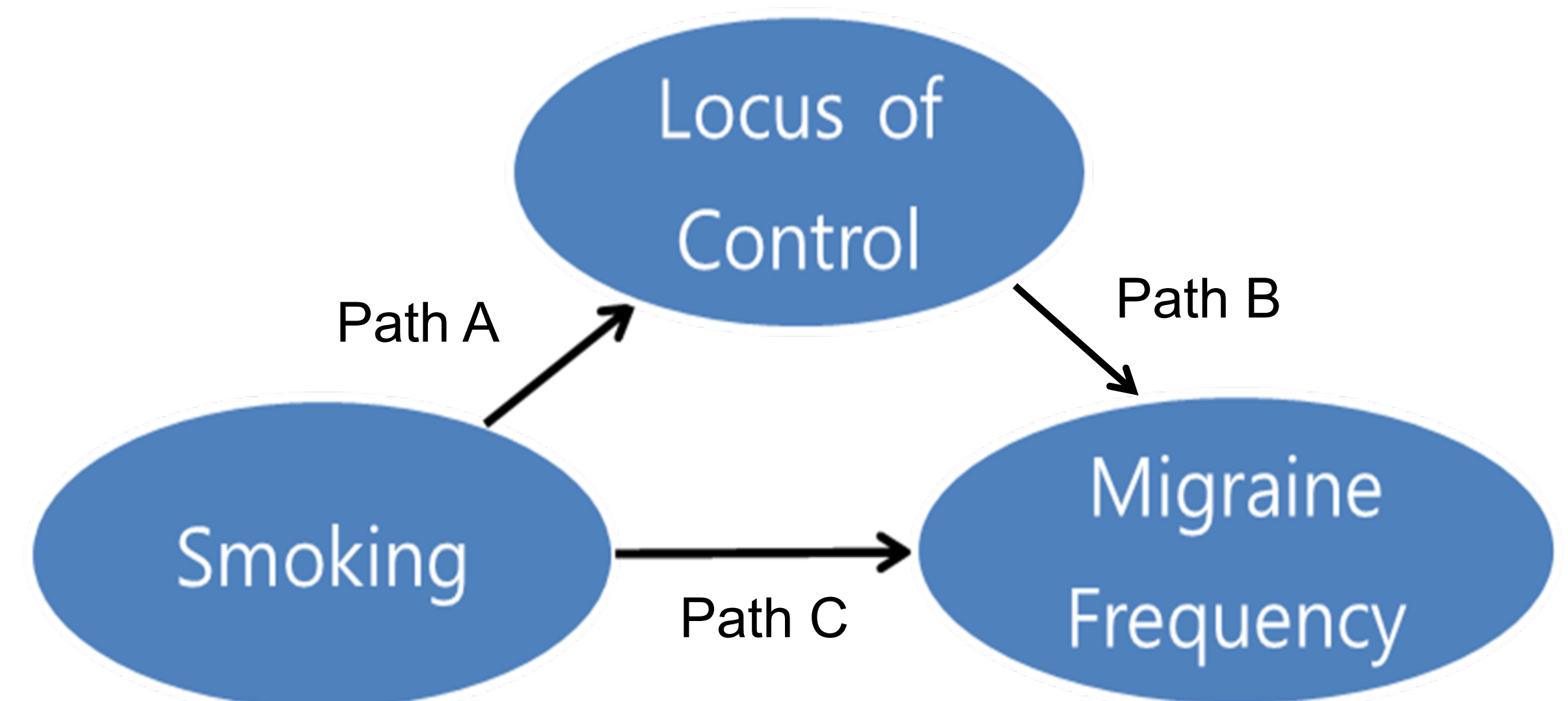


Figure 1. Mediation Model

Table 2. Baron and Kenny's mediation test: regression test results (N = 2,000)

Test path A						
Variables	R	R <sup>2</sup>	R <sup>2</sup> change	F change	β	t
Smoking	.07	.005	.004	9.269	-.068**	-3.044
Test mediation						
Variables	R	R <sup>2</sup>	R <sup>2</sup> change	F change	β	t
Step 1	.049	.002	.002	4.773		
Smoking					.049*	2.185
Step 2	.506	.256	.255	343.913		
Smoking					.015	.750
LOC					-.505***	-26.104

Note: Outcome = Migraine Frequency, LOC = locus of control status (0=external/migraine LOC, 1=Internal LOC). To test mediation, 1) we tested path A and p level was significant; 2) we tested path C and mediation of LOC between smoking & migraines. P levels for each step were significant; 3) we found beta for predictor (smoking) at step 1 is larger than beta for smoking at step 2 and concluded a mediation effect existed for LOC on the relationship between smoking and migraine frequency.

## Conclusions

- Locus of control fully mediated the relationship between smoking and migraine frequency among female chronic migraineurs who smoke. An increase in smoking is related to a decreased sense of internal LOC and simultaneously increased frequencies of migraine headaches.
- Previous studies indicated that smoking may increase pain sensitivity due to nicotine withdrawal and chronic pain suffers smoke more in order to relieve increased pain perception. This study added insight into the underlying mechanism between smoking and migraine headaches by examining the mediating effect of locus of control.
- Chronic migraineurs who smoke may develop beliefs that their headache is not controllable and therefore they smoke to self-medicate their pain. However, paradoxically, their pain decreases temporarily but increases in long term. Throughout this experience, they may develop a sense of helplessness or belief that migraine controls their lives.
- Clinicians treating female migraineurs who smoke should be mindful that these patients may experience a lower internal sense of control over their chronic migraine headaches and may report more frequent migraine attacks. In turn, this may result in higher levels of medication use and less knowledge of or reliance on psychological pain management techniques.

References: Available upon request

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