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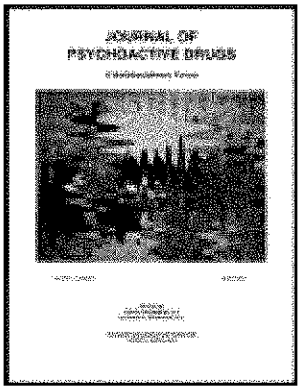

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Who Are Medical Marijuana Patients? Population Characteristics from Nine California Assessment Clinics†

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Abstract — Marijuana is a currently illegal psychoactive drug that many physicians believe has substantial therapeutic uses. The medical literature contains a growing number of studies on cannabinoids as well as case studies and anecdotal reports suggesting therapeutic potential. Fifteen states have passed medical marijuana laws, but little is known about the growing population of patients who use marijuana medicinally. This article reports on a sample of 1,746 patients from a network of nine medical marijuana evaluation clinics in California. Patients completed a standardized medical history form; evaluating physicians completed standardized evaluation forms. From this data we describe patient characteristics, self-reported presenting symptoms, physician evaluations, other treatments tried, other drug use, and medical marijuana use practices. Pain, insomnia, and anxiety were the most common conditions for which evaluating physicians recommended medical marijuana. Shifts in the medical marijuana patient population over time, the need for further research, and the issue of diversion are discussed.

Keywords — anxiety, cannabis therapeutics, insomnia, medical marijuana, pain

Medicinal preparations containing marijuana (cannabis) were widely used in many societies for centuries. Dr. William O'Shaughnessy introduced it as a modern medicine in Europe in 1839. Marijuana was prescribed for therapeutic use in American medical practice for a variety of conditions from the mid-nineteenth century into the twentieth. Marijuana was admitted to the *United States Pharmacopoeia* in 1850 and listed in the *National Formulary* and the *US Dispensatory*. Major pharmaceutical companies including Lilly, Burroughs-Wellcome, and Parke-Davis produced cannabis-based therapeutic agents (Brecher et al. 1972).

In 1936, the Federal Bureau of Narcotics advocated a law prohibiting its use, which Congress passed in 1937, against the advice of the American Medical Association (Grinspoon & Bakalar 1993:9–11). This law, along with increased prescribing of aspirin and barbiturates, pushed cannabis out of the *United States Pharmacopoeia* and common medical practice by 1942.

After nonmedical cannabis use spread in the 1960s, the number of Americans reporting lifetime prevalence

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increased sharply. Recent estimates from the National Survey on Drug Use and Health show that 102,404,000 Americans have used this drug, 41% of the population aged 12 and over, or about half the adult population (SAMHSA 2010). This widespread use led to a gradual rediscovery of the therapeutic uses of cannabis, albeit largely without physician involvement.

Alongside the spread of nonmedical use, in 1964 scientists determined the precise chemical structure of delta-9 tetrahydrocannabinol (THC), thought to be the most significant psychoactive ingredient in cannabis (Gaoni & Mechoulam 1964). This stimulated research in the clinical pharmacology of cannabinoids. Many physicians in clinical practice also recognized the therapeutic potential of cannabis (Irvine 2006; Charuvastra, Freidmann & Stein 2005), specifically, for example, for pain (Woolridge et al. 2005), as an antiemetic for chemotherapy patients (Doblin & Kleiman 1991), or for symptoms of AIDS (Abrams et al. 2003). More recently a broader medical literature documenting the therapeutic properties of endogenous cannabinoids has developed (e.g., Nicoll & Alger 2004; Lehmann et al. 2002; Hall, Degenhart & Currow 2001). Numerous case reports in the medical literature also have suggested that cannabis has therapeutic potential for a variety of conditions. But rigorous experimental research that might determine more precisely the therapeutic efficacy of cannabis for specific conditions has been blocked by the Drug Enforcement Administration (see Zeese 1999; *Alliance for Cannabis Therapeutics v. Drug Enforcement Administration* 1994).

This combination of increasing therapeutic use and federal government opposition ultimately led to passage of new state laws providing for the medical use of cannabis upon physician recommendation. Since 1996, 15 U.S. states and the District of Columbia have passed such laws: California, Alaska, Oregon, Washington, Nevada, Colorado, Maine, Montana, Michigan, and Washington, DC by ballot initiative; Rhode Island, New Mexico, Vermont, Hawaii, and New Jersey by state legislation.

The first of these laws was California's Proposition 215, the Compassionate Use Act, passed in 1996 (*San Francisco Chronicle* 1996). This act made it legal under state law for patients to possess and use cannabis if recommended by their physicians. Numerous medical and scientific associations endorsed medical use of cannabis and/or supported further research into its therapeutic potential. These included the American College of Physicians (2008), the American Public Health Association (1995), the British Medical Association (1997), the Canadian Medical Association (2005), and the Institute of Medicine of the National Academy of Sciences (1999).

Such elections and endorsements notwithstanding, the Bush Administration's Office of National Drug Control Policy threatened to revoke the licenses of physicians who recommended cannabis to patients. One physician challenged this policy and the U.S. Court of Appeals ruled (in *Conant v. Walters)* in 2002 that it unconstitutionally infringed physicians' First Amendment rights to freedom of speech with their patients (McCarthy 2004). Subsequent legislation and case law have left medical marijuana (MM) patients and their physicians in legal limbo:

- In 2003, the California legislature passed SB 420 to provide specific implementation guidelines for Proposition 215, including how counties should handle MM patient ID cards.
- Most drug law enforcement is done by local police who enforce state, not federal, drug laws. In 2005, The California Attorney General ruled that Proposition 215 is the legitimate will of the voters and is therefore valid under the California Constitution for purposes of *state* law enforcement. He advised the Highway Patrol and other state law enforcement agencies that under California law MM patients were legally entitled to possess and use cannabis for therapeutic purposes (Hoge 2005).
- In 2006, Bush administration Attorney General Gonzales sought to invalidate state MM laws, and the U.S. Supreme Court ruled (*Gonzales v. Raich* 2006) that the Compassionate Use Act—its legitimate electoral provenance notwithstanding—neither supersedes nor invalidates federal laws that prohibit marijuana use (see Mikos 2009 for a legal analysis of the states' neglected power to legalize behavior that is criminalized under federal law).
- In 2008 the Supreme Court denied without comment an appeal by two California counties that had refused to implement Proposition 215 (*County of San Diego v. San Diego NORML* 2008), thereby letting stand a lower court ruling that upheld SB 420's provisions regarding counties issuing MM identification cards.
- In 2009, Attorney General Eric Holder issued a policy stating that federal drug control agencies would no longer raid MM dispensaries if they operated within state and local laws (Moore 2009).
- That policy notwithstanding, the DEA has continued to raid MM dispensaries in California into 2011 (e.g., Blankstein 2009).

Within this grey area between conflicting state and federal laws, the number of patients who have received recommendations for medical marijuana from physicians has continued to grow, albeit by how much remains unknown. Over 1,000 MM dispensaries, delivery services, and cooperatives are said to be operating in California to meet the demand (NORML 2007). A rough estimate of the number of MM patients in California can be extrapolated from Oregon figures. Unlike California's Compassionate Use Act, Oregon's MM law set up an Oregon Medical Marijuana Program that requires centralized record keeping. As of July, 2009, some 2,983 Oregon-licensed physicians had approved 20,307 applications for MM (Oregon

Department of Human Services 2008). The population of California is 9.7 times that of Oregon (U.S. Census 2007), which yields a crude estimate of 196,978 MM patients in California. This is likely an underestimate because the California statute affords greater latitude to physicians regarding the conditions for which they can recommend MM (". . . any other illness for which marijuana provides relief"). Americans for Safe Access (2008), a MM patient advocacy group, has estimated that there are well over 200,000 physician-sanctioned MM patients in California.

Despite their growing numbers, however, the ambiguous legal status of MM patients renders them a half-hidden population whose characteristics are not well documented, with the partial exception of the San Francisco Bay Area (O'Connell & Bou-Matar 2007; Reiman 2007a). Medical marijuana will likely continue to be a contentious issue, but across fifteen states and the District of Columbia several hundred thousand people are using marijuana as a medicine recommended by physicians, and yet little is known about them as a patient population.

We intend this study as a modest contribution toward filling this gap. It presents data on the demographic characteristics, presenting symptoms, physician evaluations, conventional treatments tried, and MM use practices of patients from a network of MM assessment clinics in California.

METHODS

These data were drawn from 1,746 consecutive admissions to nine MM assessment clinics operating in California in July, August, and September 2006. These assessment clinics are not dispensaries and are not connected to dispensaries. They were located throughout the state—in the north and south, coast and central valley, and large and small cities: Modesto, Oakland, Sacramento, Hollywood, San Diego, Santa Cruz, Ukiah, San Francisco, and Santa Rosa. They charged $100 to $125 for an assessment. At the time our sample was drawn, these assessment clinics had evaluated over 54,000 MM patients. Without a comprehensive patient database or representative household surveys, there is no way to determine precisely how representative this sample is of the overall population of MM patients. Moreover, there is a large albeit unknown number of people who use marijuana medicinally but who have not sought physician recommendations or official patient ID cards, perhaps because of the expense of the assessment.[1]

Evaluating physicians interviewed potential patients and evaluated their patient medical histories for purposes of recommending MM and issuing patient identification cards under the Compassionate Use Act and SB 420. The evaluation instruments were (1) a basic patient-administered medical history questionnaire covering demographics, presenting symptoms or conditions, brief medical history, conventional and alternative medical treatments tried, drug use history, and MM use practices; and (2) a physician evaluation form using International Classification of Diseases codes (ICD-9). Each patient received and signed an extensive informed consent form noting confidentiality, which was approved by the clinics' IRB.

Most prior studies of MM patients are based on small, symptom-specific samples. Initially, the population of MM patients in the San Francisco Bay Area were people with HIV/AIDS and cancer (e.g., Harris, Mendelson & Jones 1998). Later, physicians began to recommend cannabis to patients with chronic pain, mood disorders and other psychiatric conditions (Gieringer 2002). The data reported here describe what is among the largest and most symptomatically and demographically diverse samples of medical cannabis patients to date (cf., O'Connell & Bou-Matar 2007).

RESULTS

As Table 1 indicates, the MM patients are three-fourths male and three-fifths White. Compared to the US Census of California, the patients in this sample are on average somewhat younger, report slightly more years of formal education, and are more often employed. The comparison also indicates that women, Latinos, and Asian Americans are underrepresented. Given the limitations of our data, we can offer only informed speculation as to why.

The underrepresentation of women may be in part an epidemiological artifact of the gender distribution of certain kinds of injuries (e.g., workplace, sports, and motorcycle accidents). It may also have to do with the double stigma women face in seeking MM—for using an illicit drug and for violating gender-specific norms against illegal behavior in general. Moreover, as with alcohol use, pregnant women and women considering pregnancy are likely to have health concerns and many may fear that MM could put them in jeopardy if discovered by child protection agencies.

Given the high poverty rate among Latinos and their concentration in the manual labor end of the occupational structure, Latinos are exposed to equal or greater risks of work-related injuries and to no less epidemiologic risk of other conditions for which MM is sometimes used. It seems likely that their under-representation has to do with the undocumented status of many Latinos in California. The undocumented often avoid contact with government agencies for fear of apprehension by law enforcement, for beyond arrest and incarceration this carries the risk of deportation. Such fears reduce the likelihood of Latinos accessing health care in general and MM in particular. Asian Americans are also underrepresented, but this may be because they have lower prevalence of marijuana use than other racial/ethnic groups and/or because they have their own venerable traditions of herbal medicine.

TABLE 1
Demographic Characteristics of California Medical Marijuana Patients Compared to California Census 2000, Age 18 and Over {n = 1746}

	MM Patients	U.S. Census 2000 – California
Female	27.1%	50.7%
Male	72.9%	49.3%
White	61.5%	59.5%
Latino	14.4%	32.4%
African American	11.8%	6.7%
Native American	4.5%	1.0%
Asian/Pacific Islander	4.2%	11.2%
Other	4.3%	*
18–24 Years Old	17.9%	~17.1%
25–34 "	27.5%	15.4%
35–44 "	21.3%	16.2%
45–54 "	20.4%	12.8%
55> "	12.6%	18.4%
<High School	8.8%	*
High School Graduate	42.2%	*
Some College	27.1%	*
College Graduate>	23.8%	*
Employed	64.8%	57.5%
Health Insurance	73.4%	*

*Data not available in California Census.

TABLE 2
Patient Self-Reports of Therapeutic Benefits from Medicinal Marijuana*

	Percent
To Relieve:	
Pain	82.6
Muscle Spasms	41.1
Headaches	40.7
Anxiety	37.8
Nausea/Vomiting	27.7
Depression	26.1
Cramps	19.0
Panic Attacks	16.9
Diarrhea	5.0
Itching	2.8
To Improve:	
Sleep	70.7
Relaxation	55.1
Appetite	37.7
Concentration/Focus	22.9
Energy	15.9
To Prevent:	
Medication Side Effects	22.5
Anger	22.4
Involuntary Movements	6.2
Seizures	3.2
As Substitute for:	
Prescription Medication	50.9
Alcohol	13.0

*N = 1,745; patients could report more than one benefit in more than one category.

African-Americans, conversely, are over-represented in this sample. This does not appear to stem from their prevalence of marijuana use, for representative national surveys show that Blacks generally do not have significantly higher prevalence of marijuana use than Whites (SAMHSA 2005). African-Americans may be more likely to seek MM for any of several reasons: because they are disproportionately poor, more often lack health insurance, are significantly less likely to be prescribed other medication for pain (Pletcher et al. 2008) or to receive treatment for cancer (Gross et al. 2008), and because African-Americans are a growing proportion of HIV/AIDS cases. Some of these same reasons may help to explain why Native Americans are also overrepresented, although their proportion of both this sample and the general population is too small to judge representativeness accurately.

In their medical history questionnaires, patients were asked "Which of the following best describe the therapeutic benefit you receive from medicinal cannabis? (Check the most important)." Patients typically reported more than one therapeutic benefit (mean = 3). Early studies showed most patients used MM to relieve symptoms of HIV/AIDS (Woolridge et al. 2005) or cancer, and it is likely that the majority of patients in our sample who reported "nausea" were cancer patients receiving chemotherapy. However, Table 2 suggests that cancer and AIDS patients are now a significantly smaller proportion of the total (e.g., "to relieve nausea/vomiting" 27.7%, "to improve appetite" 37.7%) and that the MM patient population has become more diverse since the Compassionate Use Act was passed in 1996 (cf. Ware, Adams & Guy 2005, on MM use in the UK, and Grotenherman 2002 on MM use in Germany).

Instead, relief of pain, muscle spasms, headache, and anxiety, as well as to improve sleep and relaxation were the most common reasons patients cited for using MM. Chronic pain also topped the list of maladies for which MM was used in another California clinical sample (Reiman 2007b).

Table 3 shows the ICD-9 diagnostic codes most frequently recorded by evaluating physicians. Pain from back and neck injuries was the most frequently coded. This appears consistent with a nationally representative Medical Expenditure Panel Survey, which found a 19.3% increase in the prevalence of spine problems between 1997 and 2005 (Martin et al. 2008). Back and neck pain was followed in frequency by sleep disorders (also increasing), anxiety/depression, muscle spasms, and arthritis. Fully half of this sample reported using MM as a substitute

TABLE 3
Conditions Most Frequently Recorded by Physicians As Reasons for Approving Medical Marijuana Patient Identification Cards*

	Percent	ICD-9 Codes
Back/Spine/Neck Pain	30.6%	[722.1–724.2]
Sleep Disorders	15.7%	[307.42, 327.0]
Anxiety/Depression	13.0%	[300.0, 311.0]
Muscle Spasms	9.5%	[728.85]
Arthritis	8.5%	[715.0, 721.2, 721.2]
Injuries (Knee, Ankle, Foot)	4.5%	[959.7]
Joint Disease/Disorders	4.4%	[716.1–719.49]
Narcolepsy	3.7%	[347.0]
Nausea	3.4%	[787.02]
Inflammation (Spine, Nerve)	2.9%	[724.4]
Headaches/Migraines	2.7%	[784.0, 346.0, 346.2]
Eating Disorders	1.1%	[783.0]

*N = 1746; some patients reported multiple symptoms and/or conditions.

TABLE 4
Other Treatment Modalities Tried for the Medical Condition(s) for Which Patients Seek Medical Marijuana*

	%	N
Prescription Medication	79.3%	1383
Physical Therapy	48.7	850
Chiropractic	36.3	633
Surgery	22.3	389
Counseling	21.0	366
Acupuncture	19.4	338
Therapeutic Injection	15.4	269
Homeopathy	12.0	209
Other Types of Treatment	11.9	208

*N = 1746; patients could report multiple other treatments.

TABLE 5
Medical Marijuana Patients' Self-Reported Current Nonmedical Drug Use, Compared to 2006 National Survey on Drug Use And Health (SAMHSA 2007)

	MM Patients	NSDUH*
Tobacco	29.4%	25.0%
Alcohol	47.5	61.9
Cocaine	0.3	1.9
Methamphetamine	0.4	0.5
Heroin	0.1	0.3
Other Opiates	1.2	**

Note: Participants were asked "Do you currently use . . ."; answers are percent responding "yes." N = 1745; patients could report more than one drug. Of smokers, 65.5% used ten or less cigarettes/day; of drinkers, 58.7% used</= one or less drinks/day.
*NSDUH figures for "past month" prevalence used as a proxy for "current use".
**Data not available in comparable form.

for prescription drugs, consistent with other studies (e.g., Reiman 2007a).

Table 4 indicates that the MM patients in the sample had tried a variety of other treatments, conventional and alternative, for the conditions for which they were seeking a MM identification card. Four in five (79.3%) reported having tried other medications prescribed by their physicians (almost half were opiates); about half (48.7%) had tried physical therapy; over a third (36.3%) had tried chiropractic; nearly one-fourth (22.3%) reported having had surgery for their condition.

Table 5 compares patient responses to the drug use questions to those in the 2006 National Survey on Drug Use and Health (SAMHSA 2007). Prevalence of tobacco use was somewhat higher than in the general population, but prevalence of alcohol use was significantly lower. Many patients reported that they valued MM because it allowed them to reduce their alcohol use. It is possible that self-reports on a self-administered instrument will underestimate illicit drug use, particularly if patients felt that admitting illicit drug use could reduce their chances of obtaining a MM identification card. Rigorous assessments of the reliability of such data must await further research, but limitations aside, these data suggest low prevalence of other illicit drug use among MM patients. While it is true that the great majority of our respondents had used marijuana recreationally, in response to a separate question over two-fifths (41.2%) reported that they had *not* been using it recreationally prior to trying it for medicinal purposes.

Table 6 presents data on patients' medical marijuana use practices. Amounts used per week varied from three grams or less (40.1%) to seven or more grams (23.3%). Two-thirds (67%) reported using MM daily while one-fourth (26%) reported using less than once a week. Half (52.9%) reported using one or two times per day while one in ten (10%) reported using three or more times per day. Patients consumed MM primarily in the evenings (52.3%) or prior to sleep (56.1%). More than two in five (42.3%) reported that when they used depended on their medical symptoms. Patients ingested MM predominantly by smoking (86.1%), although one-fourth (24.4%) reported ingesting orally and nearly a fourth (21.8%) reported using a vaporizer. These latter figures suggest that at least some of the time, many MM patients are choosing modes of ingestion that reduce the perceived risk of harms from smoking (Tan et al. 2009; Hashibe et al. 2006).

TABLE 6
Medical Marijuana Use Practices

Frequency of Medical Marijuana Use (N = 1583)*	
Daily	67.0% (1065)
<Once A Week	26.0% (409)
<Once A Month	7.0% (109)
On Days Used, Frequency per Day (N = 1574)	
1 To 2 Times Per Day	52.9% (833)
2 To 3 Times Per Day	29.0% (457)
>3 Times Per Day	10.0% (284)
Time Of Day Typically Used (N = 1745)	
Prior To Sleep	56.1% (979)
Evenings	52.3% (913)
Depends on Symptoms	42.3% (739)
Mornings	25.7% (448)
Afternoons	20.1% (350)
After Work	12.4% (217)
Middle of the Night	6.5% (114)
All Day	5.3% (93)
Mode of Ingestion (N = 1745)	
Smoke	86.1% (1503)
Oral Ingestion	24.4% (426)
Vapor	21.8% (380)
Topical	2.8% (49)
Amount Used per Week (N = 1431)	
0–3 Grams	40.1% (574)
4–7 Grams	36.5% (523)
>7 Grams	23.3% (334)

*Total n = 1745, but N's vary across questions because patients could choose more than one response and because not all responded to each question.

DISCUSSION

Rediscovery of Medicinal Utility and Diversifying Patient Population

Compared to earlier studies of MM patients, these data suggest that the patient population has evolved from mostly HIV/AIDS and cancer patients to a significantly more diverse array. The diffusion of marijuana as a medicine may have been slower than that of other medicines in conventional clinical practice because the flow of information from physician to patient is impeded by MM's ambiguous legal status. Thus, information about the potential therapeutic utility of cannabis is spread mostly via word of mouth and other informal means. This suggests that the patient population is likely to continue evolving as new patients and physicians discover the therapeutic uses of cannabis. Ironically, this trend toward increasing therapeutic uses is bringing marijuana back to the position it held in the U.S. Pharmacopeia prior to its prohibition in 1937.

Further Research

Like other medicines, marijuana's therapeutic efficacy varies across conditions and patient groups. This variation seems more likely when supplies remain illicit because standardized dosages or other quality controls are more difficult to achieve. To gain maximum therapeutic potential across the growing range of conditions for which MM is being recommended, more systematic research is needed. Longitudinal, case control, and double-blind studies are required to rigorously assess marijuana's therapeutic efficacy for specific patient groups, conditions, and diseases. With regard to shifts in the patient population, it also would be very useful to have follow-up studies of patients accessing the assessment clinics in our sample and others drawn from similar assessment clinics.

Diversion

Critics have argued that some MM patients are "gaming the system" to get marijuana for nonmedical use. Neither our data nor any other data we are aware of allow any clear-cut, empirical estimate of the scale of such diversion. Given the widespread nonmedical use marijuana in the general population (102,404,000 Americans report lifetime prevalence; see SAMHSA 2010) and the risk of arrest (847,864 Americans were arrested for marijuana offenses in 2008, 754,224 or 88.96% of them for possession alone; FBI 2009), it seems likely that at least some MM patients use MM dispensaries as sources of supply for nonmedical use.

Defining and measuring such diversion, however, is complicated at best. Given the high prevalence of nonmedical use, it is not surprising that most MM patients in our sample reported having used it recreationally before using it therapeutically. But as noted above, two-fifths had *not* been using marijuana recreationally prior to trying it for medicinal purposes. Their self-reported rates of other illicit drug use are slightly lower than those found among the general population, and their levels of educational attainment and rate of employment are comparable to the California population. Our data have clear limitations, but they contain no obvious signs that MM patients differ from the general population.

Nor is drug diversion unique to medical marijuana. A significant albeit unknown proportion of other patients obtain prescriptions for numerous drugs through legal medical channels that they then use for nonmedical purposes, for example, Valium and other benzodiazepines (Haafkens 1997), Ritalin and other stimulants prescribed for ADHD, and Oxycontin and other opiates prescribed for pain.

The diversion issue will likely become more important as the line between medical and nonmedical drug use is increasingly blurred (Murray, Gaylin & Macklin 1984). Beyond the spread of MM, Prozac and other SSRI-type antidepressants, for example, are often prescribed

for patients who do not meet DSM criteria for clinical depression but who simply feel better when taking it. Such "cosmetic psychopharmacology" (Kramer 1993) is likely to grow as new psychiatric medications come to market. The line between medical and nonmedical drug use has also been blurred by performance enhancing drugs such as steroids, so-called "smart drugs" that combine vitamins with psychoactive ingredients, and herbal remedies like *ma huang* (ephedra) available in health food stores (Burros & Jay 1996).

These examples suggest that despite the best intentions of physicians and law makers, much drug use does not fit into two neat boxes, medical and nonmedical, but rather exists on a continuum where one shades into the other as patients' purposes shift to suit situational exigencies in their health and their daily lives. It is not clear where a border line between medical and nonmedical marijuana or other drug use might be drawn nor how it might be effectively policed (see Reinarman & Levine 1997: 334–44).

NOTE

1. We are grateful to one anonymous reviewer for pointing out that the cost of these assessments may well have prevented some potential MM patients—including many impoverished HIV/AIDS patients—from obtaining ID cards, which may have affected the demographics of this sample.

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