

# WESTERN CRIMINOLOGY REVIEW

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# Western Criminology Review

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The Western Criminology Review (WCR) is a forum for the publication and discussion of theory, research, policy, and practice in the rapidly changing and interdisciplinary fields of criminology and criminal justice. The journal is intended to reflect local (Western), national, and international concerns. Historical and contemporary perspectives are encouraged, as are diverse methodological approaches. Although manuscripts that rely upon text and tables are invited, authors who use other resources permitted on the internet — e.g., graphics, hypertext links, etc., are also welcome. The publication and distribution of articles will also be accompanied by electronic commentary and discussion. The journal is made available exclusively on the Internet at the Western Criminology Review website, <http://wcr.sonoma.edu/>

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## “The Tragic Meaning of Blood”: Symbol, Myth, and the Construction of Criminology

*Keynote address delivered at the  
2006 Western Society of Criminology Conference,  
Seattle, February 25, 2006*

Jonathan M. Wender  
*University of Washington*

Good morning, ladies and gentlemen. It is my sincere honor and privilege to join you today. I am particularly delighted to have this opportunity to address the Western Society of Criminology because it was only five years ago at the WSC conference in Portland that I began my journey as an academic criminologist. At the time, I was a doctoral candidate at the University of British Columbia in Vancouver, writing—or, to put it more honestly, struggling to write—the early stages of a philosophically-oriented dissertation about policing. Anxious and curious to see how criminologists would respond to my ideas, and hoping that they might be able to assist me in shaping them more intelligently, I presented some of my work at WSC. The formal feedback that I received proved invaluable, but what I recall even more strongly is the encouragement and congeniality with which I was met. I continue to be grateful for the support that you extended to me five years ago, and can honestly tell you without a hint of flattery that my earlier involvement with WSC had a decisive effect on my work.

Shortly after receiving your gracious invitation to appear here today, I happened to find an address delivered in 1938 by the French poet Paul Valéry to the Congress of Surgeons in Paris. As I read Valéry’s address, I was struck by at least three things: first, that a poet would be asked to speak to a congress of surgeons; second, that the poet, in making such an unlikely appearance, would succeed at giving his audience some remarkable insights into the nature of their own work; and third, that the poet’s words to the surgeons would actually be pertinent to a much wider audience, far beyond the realm of medicine.

Let me elaborate on this third point by quoting a specific passage from Valéry’s address, which became the genesis for my talk to you this morning. Commenting to the surgeons on the human reaction to the sight of blood, Valéry (1970:137) remarked as follows:

By definition, of course, this kind of shock never affects you surgeons. You live in the midst of blood, and moreover must be constantly at grips

with anxiety, pain, and death, the most powerful stimulants to our emotional echo chamber. The critical moments, the extreme conditions of other lives fill every day of your life, and in your steadfast spirit the exceptional event, however distressing it may be to the persons concerned, takes its proper place among statistics governing the same category. You shoulder the heaviest of responsibilities at the most urgent and delicate of moments.

I hope to convince you today that Valéry’s eloquent words fittingly apply not just to surgeons, but also to us—to criminologists—the academics and practitioners who have chosen, like Valéry’s audience, to engage the suffering and misfortunes of human beings in order to understand and ameliorate them.

Before I say anything further about Valéry, it is only fair that I reiterate what you already know about the strange improbability of my presence before you today. I am no poet like Valéry, and my career as a criminologist is still in its nascent stages. In fact, I have spent most of the past fifteen years balancing police work with my academic work, and have only recently begun to make the transition toward becoming a full-time academic.

When Neil Boyd conveyed to me your Board of Director’s generous invitation to give this address, he asked if it would be possible for me to talk about something theoretical, which would also be related to my professional experience in policing. It might seem to you that Neil’s request was a bit unrealistic. After all, what can I actually say about my work as a social theorist or philosopher that would have any meaningful bearing on my background in police work, and vice versa? Put even more bluntly, what two things could be more distantly removed from each other than street-level police work and theory?

My brief reply to these questions is that in fact, no two things could be more closely related than policing and theory. So, not only is it possible for me to fulfill

## *“The Tragic Meaning of Blood”*

Neil’s request that I deal with theory and police work in the same address, it would actually be *impossible* for me—or anyone else—to talk about one without the other. To elaborate this point within the context of this year’s WSC conference theme of myth and reality in the social construction of crime and justice, I submit to you that it is a myth to believe that theory and practice are truly separable, whether we are talking about policing or any other kind of social action.

If we scrutinize them with careful attention, our ways of constructing crime and justice reveal the inseparability of theory and practice at every turn. There is, of course, an astounding variation in our notions of *unjust acts*—let us think generally of these acts as “*crimes*”—and also in our notion of how to respond to those acts—let us think generally of these responses as “*justice*.” However, whatever the complexity of these variations, we always begin and end with the absolute, face-to-face reality of crime and justice—of the palpability of human suffering, and of the urgent imperative to respond to it. Every point where crime and justice meet, whether it exists in a police-citizen encounter, in a courtroom, in a research study, or even in our dreams, marks an intersection that we ourselves have constructed between ideas and the practical conditions of life. To speak, then, as you have been at this conference, of the construction of crime and justice is never to speak of something artificial or arbitrary; it is to speak of a continual human struggle, which, from the moment we first become aware of it, is at once both theoretical and practical.

This morning, however, instead of trying to demonstrate in abstract terms this inseparability of theory and practice, I propose instead to do so concretely—so concretely, in fact, that I must acknowledge taking a risk that some of what I say may well discomfit or upset you. This is because I am going to talk to you about blood. I am going to tell you why I think that the human experience of blood offers a vivid illustration of the relation between theory and practice, and why that illustration serves as a reminder of what is ultimately at stake in the work that each of us does to construct crime and justice. Even though I am going to talk about blood in the context of policing, I hope you will come to agree with me that my stories may be applied far more broadly.

Now that you have a rough notion of the task that I have set for myself, let me return to Valéry’s address to the Congress of Surgeons, and read to you a further quote, from which I have taken the title of my talk. During his address, Valéry recounted to the surgeons how he had once witnessed a three year-old boy faint upon seeing a few drops of blood coming from a small cut on

a woman’s hand. He was astonished that a young child would react so powerfully and viscerally to this event, especially because, as Valéry put it, he “*had no idea of the tragic meaning of blood*” (1970:137, emphasis added). Valéry went on to observe that, by contrast, although the surgeons had a profound understanding of the meaning of blood, they nonetheless displayed a remarkable ability to treat blood with a matter-of-fact attitude.

This ability, about which I will say more later on, is one that surgeons share with many other professionals who encounter blood as part of their normal duties. If we compiled a list of these professionals, we would obviously include firefighters, paramedics, nurses, and police officers. We would probably mention laboratory technicians and funeral directors. We might also include meat cutters, fisherman, chefs, high school biology teachers, and veterinarians. And, as each day’s news tragically reminds us, I am certain that we would include soldiers. I imagine, however, that it might not occur to us right away to put criminologists on the list. But, are we not also a group with a mandate that puts us in daily contact with the spilling of blood? Like Valéry’s audience or surgeons, do we, too, not fill our days with “the extreme conditions of other lives”? Can we not say of ourselves as criminologists that with our work, as with surgery, “the exceptional event, however distressing it may be to the person concerned, takes its proper place among statistics governing the same category”?

By now, some of you must be thinking that I am simply taking Valéry’s point too far. Surely, I must appreciate that responding as a surgeon to the spilling of blood is radically different from doing so as an academic or researcher. Surely, I must see by reflecting on my experiences in policing and academia that my own responses to blood in these two arenas cannot withstand a serious comparison. In fact, for that matter, how can anyone even take seriously the idea that criminologists “respond” to the spilling of blood? Obviously, to find oneself in the physical presence of blood is not the same as retrospectively studying the events that might have caused the blood to be shed. Yet, I think that by focusing exclusively on this material difference, we lose sight of a deeper affinity that unites what we might otherwise distinguish and separate as “theoretical” and “practical” responses to blood.

With this idea in mind, I would like to talk in the widest possible sense of “responding” to the presence of blood, because this is how we will be able to get a clearer sense of blood’s “tragic meaning.” Even the simplest thought about blood constitutes a response to its reality. So, “responding” to the shedding of blood is something

that can occur in a multitude of different ways. My words to you right now are one response to blood; your reaction to what I say is another.

All of us have witnessed the spectacle of blood, and we know that the experience is something which, to varying degrees, imparts to us feelings of dread, fascination, discomfiture, mystery, and even terror or horror. However much we try to overlook or normalize the experience, the sight of blood always invites a moment of disequilibrium. Perhaps this is because we know that life's equilibrium depends on blood, and so, to see blood is to find oneself reminded of the tenuousness of existence. To lose too much blood is to lose life itself; and conversely, this is why we often speak of donating blood as giving the "gift of life."

This still leaves us to define more precisely the tragic meaning of blood. Valéry's example of the three year-old boy who faints at the sight of a few drops of someone else's blood offers a hint that very early in life, we come to realize that blood's mere physical presence conveys something awful. In fact, if I had to explain the tragic meaning of blood in a single word, I would say it comes from the fact that the experience of blood is *awful*. We tend to think of awful experiences as being extremely bad or unpleasant; and to be sure, many experience of blood are just that. However, in its fullest sense, the word "awful" refers to something that fills us with awe—with a reverential feeling of wonder, fear, or dread. Although the boy in Valéry's story was obviously unable to articulate it, his intense reaction suggests that our sense of the awfulness of blood is deeply intuitive.

I am not saying, of course, that the experience of blood affects everyone in the same way, or to the same degree. For example, I know a detective who finds blood utterly fascinating, but not particularly upsetting. When he shows up to investigate scenes of the most horrific violence, he projects an air of quiet reverence, much as if he were standing in front of a painting that depicts death or misery. Yet, once in a while, my friend will give off a nervous little chuckle that reveals a deeper feeling—a feeling that I think indicates his sense of the awfulness of blood. So, though some among us might say, "the sight of blood doesn't especially bother me," do these very words not betray an awareness that the speaker knows *exactly* how awful blood really is—even if he or she faces that awareness with a relative degree of equanimity? The first quote that I read to you from Valéry's speech brings this equanimity into focus by highlighting the moral tension inherent to vocations like surgery, policing, or criminology, where mastery demands normalizing the exceptional.

To speak of the awfulness of the experience of blood also allows us to respond to events where blood and joy are co-mingled. I am thinking especially of childbirth. Blood heralds the arrival of each new life; but does its presence also not give us an awful foreshadowing of life's end? This ambivalence may be less apparent in the arena of gleaming delivery rooms and birthing centers; however, in much of the world, the peril of hemorrhagic death for mothers remains all too prevalent. Thus, even in the joy of childbirth, the tragic meaning of blood is a constant presence.

Any experience of blood necessarily carries within it, however vaguely, our intuition of blood's sacred significance. It does not matter that modern science constantly creates new meanings for blood, according to which we experience it in a factual and demystified way. We "type" blood; we measure its "spatter patterns"—what, though, is the meaning of the substance itself that transcends all of these analytic operations? When all is said and done, blood's physical presence will always be overshadowed by its sacred and moral significance—by its awful quality. Its mark or stain will always carry a significance far greater than what can ever be said of it in clinical or forensic terms. To appreciate that significance not only allows us to see blood's tragic meaning, but also reveals the hidden role of that meaning in shaping our practical encounters with blood. In a drop of blood then, we may find the entire interrelation between theory and practice.

For most of the remainder of this talk, I am going to share with you what I must frankly admit are some awful stories about blood. I hope to engage your attention without offending you, and apologize in advance if I falter in my rhetorical balancing act.

### The Blood of Victims

To show you how the tragic meaning of blood can change in an instant, I will begin by telling you about a case of domestic violence. Early one evening, I responded to a report of an assault at a large apartment complex. When my partner and I arrived, we saw a dazed man sitting on the sidewalk outside one of the buildings. He was covered in so much blood that I thought he had been stabbed or shot. I hurried over to him, and asked how he had gotten injured. His flat response still haunts me years later: "I'm okay," he replied, "but I think she's dead." It instantly struck me that the blood all over the man was not his own. Before I could say anything, he added, "Man, I think I killed her." I moved quickly to put him in handcuffs, and noticed that his hands were bleeding and badly swollen. I was soon to discover why.



## *“The Tragic Meaning of Blood”*

My partner and I left the man with another officer, who had also responded to the call, and went upstairs to the apartment reported as the location of the assault. The door stood wide open. Inside, furniture was upended and things were strewn everywhere. Most conspicuous, however, was the blood: it was smeared on the walls, it was smeared on the carpets, it was on the bathroom floor—it was literally everywhere. We searched the apartment, fully expecting to find a body. However, we found nothing. My partner looked at me nervously and commented on the eeriness of the scene.

We went to the apartment across the hallway. “She’s in here,” said the distraught woman who met us at the door. The victim was lying on the woman’s floor, so severely beaten that her head was swollen to double its normal size. Her eyes were swollen completely shut, and the rest of her face was obscured beneath a mask of fresh and clotted blood. The woman’s boyfriend had beaten her with such ferocity and for so long a time that he eventually became too tired to continue, and left. That is how my partner and I found him, covered in blood, exhausted from the sheer exertion of his attack. After her boyfriend left, the victim somehow managed to crawl across the hallway to her neighbor’s apartment. She was taken by ambulance to the emergency room.

I told her boyfriend that he was under arrest for attempted murder, and read him his rights. As I was driving him to the police station, he asked me, “Did I kill her?” I told him that he had not. In an exasperated tone he replied, “Man, I just kept beating the bitch and beating her, but she wouldn’t die.” He muttered this statement two or three more times. The suspect later confessed to what his girlfriend would also subsequently tell investigators: that he had subjected her to a prolonged assault that went from room to room in the apartment, and ended up with his pinning her on the bathroom floor and beating her in the face and head.

I no longer remember the specific extent of the victim’s physical injuries. In many ways, however, the real horror of this incident was its culmination in a face-to-face attack, in which the suspect must have looked at his girlfriend until her eyes were so swollen that she could no longer return his gaze. To assault someone until she cannot look back at her attacker, and then to obscure her face beneath her own blood is to commit an act that demands to be understood as a form of effacement—an attempt to annihilate the most basic form of the other person’s presence. If this is true, what we might first regard in the limited terms of legal analysis or forensic investigation emerges in its even deeper awfulness as an attempted sacrifice.

To engage this awfulness is to look beyond the evidentiary presence of bloodstains on a human face, and consider what they ultimately represent. When I initially contacted the suspect, I had not yet realized that most of the blood in which he was covered was not his own. Conversely, some of the blood masking the victim’s face was almost surely her boyfriend’s. The violent intermingling of the blood of the attacker and the blood of the victim produced the horrible effect of covering the victim’s identity, and—even if only momentarily—concealing the suspect’s guilt.

Think for a moment about the idea of *consanguinity*, which literally means “with blood.” It refers specifically to family relationships by blood, but also applies generally to any close bond. In the brutal attack that I have just described to you, the entire moral significance of consanguinity was inverted with a mixing of blood of the cruelest kind. With this idea in mind, consider an apparently simple fact of evidence. Bloodied knuckles can present strong evidence of assaultive actions. But more fundamentally, what deeper truth emerged from what I saw before me in this case: a swollen pair of hands, smeared thickly with blood? The dried blood of his girlfriend on his hands, intermingled with his own, revealed a truth that defied what any investigative facts or forensic evidence could begin to reveal. Whose blood is the suspect’s, and whose is the victim’s? In my next story, it was not the question of the blood’s origin that changed, but the circumstances under which it was shed.

### **The Blood of a Suspect**

One night, a colleague of mine tried to stop a speeding car. The driver refused to pull over, and a high-speed pursuit began. My colleague chased the car for several minutes until it halted at the entrance of a hospital emergency room. It turned out that the passenger in the back seat had been shot in the head. He was rushed inside for treatment.

While the emergency room staff frantically worked to save the victim, I joined numerous other officers in converging on the scene in front of the hospital. A situation like this is always confused and chaotic. Some officers went into the emergency room to keep track of the victim’s situation, and to ensure the chain of custody for any evidence that might be gathered—bloody clothing, shoes, and so on. Other officers remained outside, where the pursuit had ended. The car and the area around it needed to be sealed off for detectives. The other occupants of the car were extremely distraught, and had to be separated and interviewed. Officers worked quickly



to gather information about the shooting—where it had occurred, what might have precipitated it, and of course, who might have been responsible.

The other occupants of the car reported that they had been driving along when gang members in a passing vehicle fired on them, striking the victim in the head. However, my colleagues and I soon determined that the real story was quite different. We learned that the gunshot victim had met the other occupants of the car in a convenience store parking lot in order to sell them some drugs—LSD, I seem to recall. When the victim got into the car to conclude the transaction, one of the passengers brandished a handgun and demanded his drugs and cash. Then, apparently by mistake, the passenger shot the victim in the head. In a panic, the driver sped off to the emergency room. The wounded passenger could not be saved: he had sustained massive brain trauma and died at the hospital. Another drug-related homicide; another dead drug dealer. This drug dealer was just fifteen years old.

I walked over to the empty car and looked inside. The victim's bloodstained ball cap lay on the back seat. The seat cushion where he had been sitting was stained with fresh blood. Blood droplets spattered the interior of the car. Detectives arrived at the hospital and processed the crime scene. What an odd concept: "processing" a crime scene. How *does* one really *process* a scene like this—a planned robbery turned unplanned homicide; a teenager shot and killed; shocked parents notified—not just the shocked parents of the victim, but of the suspects, too—like the victim, only teenagers themselves? Beyond the technical, forensic, and investigative tasks, what remains unprocessed for the very reason that it exceeds all attempts at processing? What remains, I propose to you, is the tragic meaning of blood—its awfulness.

Here is the same paradox of which Valéry spoke to the surgeons: how does one gaze matter-of-factly at the scene of crime and combine the legal mandate for proper investigation with the moral and sacral mandate to be astonished and awed? Do the two not work at cross-purposes with each other?

As I look back on this incident, what lingers most strongly in my recollections is not the confusion in front of the hospital, the x-ray image of a bullet lodged in a boy's brain, the discovery by a man the following morning of a handgun lying innocuously in his flowerbed, nor even the conversation that I had with the suspect, who had only intended that night to get some drugs and cash, and ended up killing another teenager instead. No—what I remember most clearly is the bloodstained ball cap lying on the bloodstained car seat. As evidence of the

crime, the ball cap and car seat became evidence, and were photographed and processed accordingly. In the years since the shooting, I have occasionally shown these photographs to kids in trouble, as an illustration of the unforeseen and irreversible tragedies that can occur in the blink of an eye.

Some of the kids who see these photos adopt a blasé attitude; others are less self-consciously upset. A bloodstain, sometimes even more than flowing blood itself, has a haunting quality that heightens blood's tragic meaning by drawing attention to a human being who is no longer immediately present. You will understand precisely what I mean if you think about photographs depicting pools or stains of blood that remain where people have been injured or killed. So, if people such as the woman in my first story convey one awful sense of blood's tragic meaning, bloodstains separated from their origin leave a trace that leaves us equally awestruck. The philosopher Paul Ricoeur makes a similar observation in *The Symbolism of Evil*, where he discusses the meaning of stains. Violently spilled blood, says Ricoeur, does not just stain—it defiles; and "the defilement that comes from spilt blood is not something that can be removed by washing" (1967:36). Let me tell you another story about blood stains, and I think you will appreciate what Ricoeur is trying to say.

### Blood Spilled Mysteriously

Late one afternoon, I was sent to check on a suspicious circumstance at a motel well known for chronic drug-related activity. The label "suspicious circumstance" is a catch-all category used to dispatch police incidents that fall outside any kind of immediately-apparent definition. In this case, it seemed that one of the housekeepers had found a large amount of blood in one of the rooms.

I arrived and contacted the housekeeper outside the room in question. She told me that she had gone to clean a recently-vacated room, and found the bed sheets and mattress heavily soaked with fresh blood. She was not exaggerating. In addition to the blood on the bed, the bathroom sink and countertop were spattered with blood, and the tub was full of bloody water. There was so much blood in the room that I could smell it.

Not knowing the source of the mysterious blood, I called for an evidence technician and detective to respond to the scene. I followed a number of leads, and eventually succeeded in finding a relative of one of the people who had been registered to stay in the room. My colleagues and I were able to determine that the blood had come from a botched attempt at self-treatment of a severe abscess caused in the victim's leg by repeated heroin

injections. Without medical insurance, and afraid to call for an ambulance for fear of getting police involved, the victim and his girlfriend decided to try to deal with the abscess by themselves, as best they could. They eventually had no choice but to go the emergency room. The investigation was closed—in the eyes of the criminal justice bureaucracy, the meaning of the blood had been clearly determined.

The awfulness of blood in this situation was unrelated to any criminal act other than the apparent use of illegal drugs. For an overburdened bureaucracy, the quick resolution of the case was a blessing—no protracted investigation, no homicide, no body. To paraphrase Ricoeur, however, even if the stains were removed, the defilement persisted. It is a defilement staining a society in which a man would risk bleeding to death in a motel room rather than seek medical attention. Perhaps, then, in reflecting on the tragic meaning of this man's blood, and what it symbolizes, we will find not just the misery of addiction, but of the compounding of that misery through the cruel and ineffective response of its criminalization. In this situation, blood was shed in the anonymous space of a motel room, and the mystery of its origin was also resolved in total anonymity: I never even set eyes on the victim. Sometimes, however, one experiences the awfulness of bloodshed when it first occurs.

### **Life Draining Away**

This is what happened to me during an incident that occurred while I was off-duty, attending a conference in Chicago in 2003. Those of you familiar with police operations will probably know that in most situations, officers usually arrive on scene after a tragedy has occurred. Rarely is the incident itself witnessed firsthand. There are exceptions.

I was in downtown Chicago, walking along Michigan Avenue on the way back to my hotel after dinner, when I heard the high-pitched acceleration of a car, followed by the screeching of brakes. I saw the car spin out of control in a complete circle, jump onto the sidewalk, and strike a woman. I ran across the street, and identifying myself as a police officer, pushed past several other people to reach the woman. She lay motionless in the street, thick blood pouring from her head in an awful juxtaposition: life draining into the gutter. After enough years of seeing critically injured people, one develops a certain intuitive sense that someone is dying; and I knew that this woman was probably not going to live. A man rushed through the gathering crowd and told me he was a paramedic. He looked at the woman, gave me a shocked glance, and

shook his head saying, "This is beyond me." Another bystander came forward and identified himself as a doctor. He, too, looked at the woman; and we exchanged a glance that silently conveyed our common intuition. I left the woman in his care, ran over to the car that had hit her, and detained the driver until Chicago PD officers arrived. I gave one of the CPD officers a quick report on the situation. He declined further assistance, so I turned and walked away. I later read in the newspaper that the woman had died at the hospital. She was a tourist from out of town, and had been walking down the street beside her husband when she was killed. The driver was charged with vehicular homicide.

### **The Fear of Blood**

As I walked back to my hotel, I looked down at my hand, and saw some dried blood on my fingers. It was actually just a small amount. I surmised that it had probably gotten there when I had tried to check for the woman's carotid pulse. I immediately started checking my pants and coat for other bloodstains, and determined that my first act upon returning to my room would be to wash my hands and decontaminate myself. "Decontaminate" myself—what a strange notion—wash away a stain, an impurity, a source of possible infection (see Douglas, 1966).

There is no theme as constant and universal in police training as officer safety. For obvious reasons, cops spent a great deal of time thinking about intelligent ways to avoid getting hurt or killed. Most people rightly imagine that they harbor nightmares of getting shot; however, it usually does not dawn on them that officers are almost equally fearful of blood. As much as I still remember much of my academy training about tactical safety, I recall with equal vividness learning about the perils of bloodborne pathogens. Rookie officers graduate from the academy convinced that every person they meet will try to kill them; and they are similarly convinced that coming into contact with the smallest drop of blood is a fate to be avoided at all costs. It goes without saying that there are plenty of legitimate clinical reasons to fear blood as a potential biohazard, and to take universal safety precautions such as wearing gloves and washing hands. Officers typically review these precautions annually as part of their mandated training. They also review procedures for handling and packaging blood evidence such as hypodermic syringes, vials of fresh blood, and blood-soaked clothing.

Beyond their rational basis, what fascinates me about bloodborne pathogen training and the rituals of

handling blood is how they recast the tragic meaning of blood as a narrow issue of infection control. Our sense of the awfulness of blood seems driven here by what anthropologist Claude Lévi-Strauss calls the primordial human fear resulting from “the conjunction of the dead and the living” (1983:151-2). Today, ancient taboos and myths about the awful nature of blood are recast as horror stories of needlesticks and contamination. The trunk of the typical patrol car is filled with devices for warding off evil—gloves, eye shields, disposable Tyvek® jumpsuits, antibacterial hand wash, sharps containers, biohazard waste bags, and so on.

Arriving at any scene involving blood brings the admonition to “glove up.” Doubtless out of sheer reflex, the doctor in the street beside me in Chicago yelled out for someone to give him gloves. Obviously, there were none to be had. I remember going to a stabbing fairly early in my career. As I began kneeling down to assist the victim, a senior officer admonished me, “You’d better glove up!” Processing blood evidence or evidence contaminated with blood involves intricate rituals of packaging and labeling, deviation from which invites sharp rebuke from crime labs or evidence technicians. Even in a vocational culture famed for its hidebound indifference towards supervisory criticism, those rebuked for deviating from proper procedures for handling blood evidence contritely accept their chastisement.

### The Sacredness of Blood

If Lévi-Strauss is correct, then whatever their obvious basis in scientific and medical fact, our present-day taboos about blood draw on a deeper awareness that blood “means” something profound. More accurately, to speak of blood’s tragic meaning is to recognize that, beyond its medical or forensic qualities, blood has a *sacred meaning*. It is this sacred meaning that looms in the background for surgeon, police officers, and criminologists. Even if it is overlooked, consciously ignored, or dismissed altogether as superstition, it is still there. The tragic meaning of blood and its underlying sacredness pose a paradox for modern society. The paradox is that the more we know about the physical nature of blood, and the more we apply that knowledge in investigative and clinical ways, the more we tend to forget blood’s sacredness and tragic meaning. To reconnect this with my aim of shedding light on the interrelation of theory and practice, I would say this: the more our theories about blood are cast strictly in scientific or clinical terms, the less we remember about its tragic nature in our practical actions.

With this idea in mind, I would like to relate to you

one final incident—a case of a domestic feud that ended violently in a double suicide. The case involved a situation in which, as I think you will see, the sacredness and tragic meaning of blood were at the very center of events. Without going into excessive detail, I will just tell you that the situation grew out of a dispute between a young couple, who were engaged to be married, and the prospective groom’s father. The bride-to-be fell out of favor with her prospective father-in-law. The situation reached the boiling point when the man ordered his son to break off the engagement. The woman became so distraught that she hanged herself; and in an especially tragic turn of events, her fiancé was the one who discovered her body. This led to a violent confrontation between the fiancé and his father. He attacked his father and tried to stab him, but the father was able to escape. The fiancé ended up fatally stabbing himself.

I was not personally involved in this incident, nor were any of my colleagues. This is because, as some of you might have already realized, it comes from Sophocles’ *Antigone*. The dead woman in the incident is Antigone. Her fiancé’s name was Haemon, which also happens to be the Greek word for “blood.” Haemon is the root of English words such as “hemorrhage” and “hematology.” Sophocles (1994:117) describes in gory detail the scene in which Haemon stabs himself:

... then the unhappy man, furious with himself,  
just as he was, pressed himself against the sword  
and drove it, half its length, into his side. Still  
living, he clasped the maiden in the bend of his  
feeble arm, and shooting forth a sharp jet of  
blood, stained her white cheek.

What is Sophocles telling us here, and how does his message bear on our work as criminologists? By naming one of his characters after blood, he left us an obvious clue that his play should be viewed in no small measure as a *study in hematology*—not, of course, in its modern medical sense, but in its wider sense as a meditation on the logic of blood, and where that logic begins and ends.

So, now that I have told you several awful stories about blood, how are we to see them more clearly as illustrations of the interrelation of theory and practice? My purpose in sharing these stories has been to try to suggest that blood’s presence eludes and transcends the practical attempt to contain it. Blood’s flow can often be controlled, but its tragic meaning resists all such efforts. A story such as that of the deaths of Antigone and Haemon takes the tragic meaning of blood and places it front and center, in a way that we sometimes overlook in our own day and age, when we are so eager to control, predict,

and categorize. The awfulness of blood is something that we cannot control, predict or categorize, so we tend to let it recede into the background. In a certain sense, that ability has created enormous blessings, as the work of modern surgery makes so apparent. Yet, the price of those blessings is a potentially catastrophic forgetfulness. I would put it to you like this, again drawing from Paul Ricoeur’s argument about the symbolism of evil: when we pretend to be able to desacralize blood, we create the myth that we can separate the theoretical from the practical, and more broadly, the ethical from the physical.

This is the basic change that has obscured the tragic meaning of blood. Still, even in an age where surgery has become an operational task of enormous technical complexity, and when policing and criminology similarly experience blood as an abstract “matter of fact,” something lurks in the background, which we ignore at our own peril. Many of our prevailing social constructions of crime and justice tend to dismiss the tragic meaning of blood as irrelevant to the everyday workings of a society that does not want to challenge its dominant belief that the ethical and the physical can be separated. But, it seems to me that the stories I have told you today challenge that supposition, and show that what might seem at first glance to be a remote theoretical question about something like the tragic nature of blood is inseparable from our ordinary practical lives. Our challenge as criminologists—as a profession that works with blood even when we do not realize it—is to strive to respond holistically to blood, and to be constantly mindful of the real tragedy that comes

from ignoring it. As Mircea Eliade says, “the true sin is forgetting” (1959:101). Thank you! I would be pleased to respond to your questions or comments.

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## Do Guns Matter? A Multi-level Cross-National Examination of Gun Availability on Assault and Robbery Victimization

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**Abstract.** *This study examines the relationship between city levels of gun availability and individual assault and robbery victimization. Existing theoretical approaches to guns and crime are integrated with opportunity theory to provide a richer understanding of the dynamic between guns and crime. Data for this analysis are drawn from a sample of 45,913 individuals nested in 39 cities in developing nations. Results of a multi-level, cross-national examination using hierarchical linear modeling indicate that city levels of gun availability influence individual odds of gun crime victimization, but not individual odds of overall crime victimization. This suggests that individuals who live in cities with high levels of gun availability have higher odds of being the victim of gun assault or gun robbery than individuals who live in cities with low levels of gun availability. The results, however, find little support for the proposition that city-level gun availability interacts with individual behavior to influence individual odds of assault or robbery victimization.*

**Keywords:** guns; violence; gun crime; opportunity theory, cross-national

### Introduction

The relationship between gun availability and crime is an intensely debated topic. Competing perspectives have emerged that view guns as a cause of crime, a mechanism to reduce crime, or unrelated to crime. As a result, no consensus has materialized on this issue. The existing literature on this issue has yielded contradictory findings (Centerwall, 1991; Cook, 1987; Cook and Ludwig, 2006; Hemenway, 2004; Hoskin, 2001; Kleck, 1979; Kleck, 1984; Kleck and Patterson, 1993; Krug, K. E. Powell, and Dahlberg, 1998; Magaddino and Medoff, 1984; McDowall, 1986; McDowall, 1991; Miller, Azrael, and Hemenway 2002b; Sloan et al., 1988; Sorenson and Berk, 2001; Stolzenberg and D'Alessio, 2000). Further complicating this issue is the fact that the extent and nature of gun effects likely varies across types of crime. Research in this area has also been hampered by data limitations and methodological constraints. As a result, many questions concerning the relationship between gun availability and crime have gone unanswered.

This study aims to address three questions concerning the relationship between gun availability and two particular types of crime, assault and robbery, that have not yet been explored. First, to what extent does gun availability operate at the macro-level (specifically, in cities) to influence individual assault and robbery victimization? Existing macro-level studies have focused on the net effects of levels of gun availability on rates of crime (Hemenway, 2004; Hoskin, 2001; Kleck, 1979;

Krug, Powell, and Dahlberg, 1998; McDowall, 1991; Miller, Azrael, and Hemenway, 2002a; Sloan et al., 1988; Sorenson and Berk, 2001). Significant results from these studies imply that individuals living in areas with high levels of gun availability will have a higher risk of violent gun crime victimization. This is because a larger number of residents are likely to be armed in cities with high levels of gun availability than in cities with lower levels of gun availability. Despite this assumption, the failure to explicitly examine the effects of gun availability on individual victimization raises the question of whether gun availability influences individual victimization after controlling for individual behavior. One reason for the dearth of gun research examining this issue is the fact that multi-level theoretical explanations of the relationship between gun availability and individual victimization have not yet been developed. It is proposed here that the foundation for such research has been laid by previous studies that have examined the contextual factors that influence individual victimization (Garafolo, 1987; Lee, 2000; Meithe and McDowall, 1993; Sampson and Wooldredge, 1987; Smith and Jarjoura, 1989). In an attempt to increase criminological understanding of how gun availability influences individual victimization, this study integrates existing theory on guns and crime with opportunity theory (Cohen and Felson, 1979; Hindelang, Gottfredson, and Garafolo, 1978)

Second, do city rates of gun availability interact with individual risk factors to influence individual assault and robbery victimization? Predatory crime occurs in a social



context in which victims and offenders must converge in space and time (Cohen and Felson, 1979; Hindelang, Gottfredson, and Garafolo, 1978; Meier and Meithe, 1993). In order to truly understand the nature of this process, cross-level interactions must be explored. If we assume city-level gun availability influences individual crime victimization, it is also plausible that these effects are more pronounced for individuals who exhibit certain attributes or behavior. Previous studies have explored the possibility that contextual factors interact with individual behavior to influence individual victimization (Cohen and Felson, 1979; Hindelang, Gottfredson, and Garafolo, 1978; Meier and Meithe, 1993; Meithe and McDowall, 1993). None of these studies, however, considered guns in the analysis.

Third, to what extent does city-level gun availability influence individual crime victimization in developing nations? The overwhelming majority of research on guns and crime has focused on the United States. The existing cross-national research on this issue primarily has been confined to Western developed nations (Hoskin, 2001; Killias, 1993a; Killias, 1993b; Krug, Powell, and Dahlberg, 1998). This has limited our ability to ascertain whether the findings from existing studies can be generalized to developing nations. As a result, we do not know whether gun availability predicts crime in nations with different social structures and cultures. Previous studies have found that the mechanisms through which certain predictors (i.e., economic inequality) influence crime differ in developed and developing nations (Bennett, 1991; Rosenfeld and Messner, 1991). This suggests that explicit tests are warranted that examine the relationship between guns and crime in developing nations.

These questions are addressed using data from the 1996 and 2000 waves of the International Crime Victim Survey. Hierarchical linear modeling is used to assess the effects of gun availability on individual assault and robbery victimization in a sample of 45,913 individuals nested in the largest cities of 39 developing nations. The analyses performed here represent the first attempt to test the relationship between gun availability and crime victimization using multi-level data from a cross-national setting.

## **Theory**

### *Guns and Crime*

No dominant theoretical perspective exists that explains the relationship between gun ownership and crime. The basis for such a perspective, however, has been

proposed by Kleck and McElrath (1991) who suggest that weapons are a source of power used instrumentally to achieve goals by inducing compliance with the user's demands. The goals of a potential gun user are numerous and could include money, sexual gratification, respect, attention, or domination. Notably, most of these goals can be achieved by brandishing a gun but not necessarily discharging one. Unlike most criminological research, which assumes that the possession of weapons is inherently violence enhancing (i.e., Zimring, 1968; Zimring, 1972), Kleck (1997) suggests that guns can confer power to both a potential aggressor and a potential victim seeking to resist aggression. When viewed in this manner, several hypotheses can be derived concerning the relationship between gun availability and crime. The first is that increasing gun availability increases total rates of crime. The second is that increasing gun availability increases gun crime. A third is that increasing gun availability reduces crime. The fourth and final hypothesis is that gun availability and crime rates are unrelated.

Increasing gun availability can increase crime in two ways. The first is *facilitation*, which occurs when the availability of a gun provides encouragement to someone considering an attack or to someone who normally would not commit an attack. This encouragement is derived from the fact that the possession of a gun can enhance the power of a potential aggressor, thereby ensuring compliance from a victim, increasing the chances that the crime will be successfully completed, and reducing the likelihood that an actual physical attack (as opposed to a threat) will be necessary. This is particularly important in situations when the aggressor is smaller or weaker than the victim. In such cases, the aggressor's possession of a gun can neutralize the size and strength advantage of an opponent (Cook, 1982; Felson, 1996; Kleck, 1997). Guns can also facilitate crime by emboldening an aggressor who would normally avoid coming into close contact with a victim or using a knife or blunt object to stab or bludgeon someone to death.

An additional way that guns can increase crime is by *triggering* aggression of a potential offender. This "weapons effect" is said to occur because angry people are likely to associate guns with aggressive behavior (Berkowitz and Lepage, 1967). Similarly, it has been suggested that the presence of a gun is likely to intensify negative emotions such as anger (Berkowitz, 1983). From this perspective, increased levels of gun availability will increase crime because individuals who feel inclined to commit a crime are likely to envision a gun as a requisite tool for successfully completing the task.

Increasing gun availability also can increase the like-

likelihood that gun crimes are committed. This can intensify violence via the *weapon instrumentality effect* (Cook, 1991; Zimring and Hawkins, 1997b). The basic premise of this perspective is the use of a gun during the commission of an assault or robbery (1) increases the likelihood of death or serious injury, (2) provides aggressors with the opportunity to inflict injury at long distances, and (3) makes it easier to assault multiple victims than the use of other weapons that are commonly used to commit violent crime (i.e., knife or bat). Proponents of the weapon instrumentality effect don't necessarily suggest that the increasing gun availability increases total rates of assault and robbery. Rather, increasing gun availability increases the likelihood that guns will be used during the commission of a robbery or assault, which increases the likelihood that these crimes will result in serious injury or death. In the event that a robbery or assault escalates into physical violence, the presence of a gun gives the aggressor greater capability to inflict harm than a different weapon or no weapon at all.

A complementary perspective on this issue suggests that the availability of guns actually can reduce levels of crime (Cook, 1991; Kleck, 1997; Lott, 2000; Lott and Mustard, 1997). From this perspective, increased levels of gun availability empower the general public to disrupt or deter criminal aggression (Cook, 1991; Kleck, 1997). Kleck (1997) suggests that gun availability can disrupt criminal aggression in two ways. First, an armed victim can prevent the completion of a crime by neutralizing the power of an armed aggressor or shifting the balance of power in favor of the victim when confronted by an unarmed aggressor (Kleck, 1997; Kleck and Delone, 1993; Tark and Kleck, 2004). Second, an armed victim can use a weapon to resist offender aggression and avoid injury (Kleck, 1997).

Increased levels of gun availability may also reduce crime by deterring potential aggressors (Kleck, 1997; Wright and Rossi, 1986). Criminals may refrain from committing crime due to fear of violent retaliation from victims. This deterrence can be both specific and general. For instance, a criminal may refrain from committing future attacks because they were confronted with an armed victim during a previous experience. Alternatively, a criminal may refrain from committing a criminal act if they believe that a large proportion of the pool of potential victims is armed (Rengert and Wasilchick, 1985).

The fourth and final perspective suggests that gun availability has no overall effect on levels of crime (Kleck, 1997). The absence of an effect can be the result of two things. First, gun availability simply may not influence crime. From this perspective, the use of a gun may sim-

ply reflect an aggressor's greater motivation to seriously harm a victim (Wolfgang, 1958). If true, lack of access to a gun will simply cause an aggressor to substitute another weapon to achieve a desired outcome. Second, an effect between gun availability and crime may not be detected because defensive gun use may offset the effects of guns being used for criminal aggression (Kleck, 1997). That is, any relationship might be cancelled out by offsetting or opposite effects.

The hypotheses mentioned above have two limitations. First, they fail to account for a potential multi-level relationship between gun availability as a macro-level phenomenon and individual assault and robbery victimization. Thus, little is known about whether macro-level rates of gun availability influence individual crime victimization after controlling for individual characteristics and behavior. It is plausible that any effects of macro-level gun availability on victimization might be spurious. Gun availability and victimization may be correlated because both result from demographic composition variables (i.e., the number of poor or male). On the other hand, it is also plausible that gun availability will exert an effect on individual crime victimization that is independent of individual risk factors.

The second limitation is that extant theory provides little to no guidance on whether individual characteristics and behaviors interact with gun availability to influence the probability of individual crime victimization. Existing theory on the relationship between guns and crime focuses primarily on the effect of gun availability or possession on gun offending. Researchers have not yet explored the possibility that the effects of gun availability on individual crime victimization are conditioned by individual risk factors such as age, gender, and education level. The failure to consider such possibilities has limited what is known about the role that gun levels play in influencing crime victimization. In the following section, existing theory on guns and crime is integrated with opportunity theory to provide a richer understanding of the dynamic between levels of gun availability and individual assault and robbery victimization.

### *Opportunity Theory*

Several variants of opportunity theory exist that attempt to explain crime victimization. The variants of opportunity theory of particular interest for this study are routine activities theory (Cohen and Felson, 1979) and the lifestyle/exposure theory (Hindelang, Gottfredson, and Garafolo, 1978). Although each theory is distinct, they share a considerable amount of overlap and are discussed



here as fundamental components of a broader theoretical perspective (Garafolo, 1987).

The basic premise of opportunity theory is that in order for crime to occur potential victims and motivated offenders must converge in space and time. Thus, much of the research on opportunity theory examines how the routine daily activities of individuals influence the likelihood that they will be exposed to high risk situations and environments that place them in closer proximity to motivated offenders. Cohen and Felson (1979: 593) defined routine daily activities as “any recurrent and prevalent activities which provide for basic population and individual needs.” Therefore, individuals whose recurrent and prevalent activities place them in closer proximity to motivated offenders are expected to have a high risk of victimization.

According to opportunity theory, lifestyles are shaped by “individuals’ collective responses or adaptations to various role expectations and structural constraints (Meier and Meithe, 1993:466).” Role expectations and cultural restraints play a critical role in this process because they express shared societal expectations about appropriate behavior for individuals with certain attributes. Adherence to societal expectations leads to the establishment of routine daily activities for these individuals, thereby influencing their risk for victimization. For example, males would be expected to have a higher risk of individual victimization than females because societies place fewer constraints on the behavior of males, thereby increasing the likelihood that males would spend more of their time in the public domain and other high risk environments than females.

One conspicuous limitation of the early work on the routine activities and lifestyle/exposure theories is the failure to explicitly specify the manner that the social environment influences the context of individual victimization. In recent years a growing number of studies have attempted to address this issue (Garafolo, 1987; Lee, 2000; Meier and Meithe, 1993; Meithe and McDowall, 1993; Sampson and Wooldredge, 1987; Smith and Jarjoura, 1989). These studies have revealed the importance of the social context in determining individual risks of victimization, but have not considered the role that gun availability plays in this process. The following section integrates aspects of the research discussed above to lay the foundation for a theoretical explanation of the relationship between city-level gun availability and individual assault and robbery victimization.

### *Guns, Opportunity, and Victimization*

There are three ways that city-level gun availability

can be conceptualized to have a direct effect on individual risk of victimization. First, higher city-level gun availability can *facilitate* individual victimization. This would occur if increasing city-level gun availability motivated city residents who normally would not commit crime to become criminal aggressors. From the perspective of opportunity theory, this facilitation effect could increase the pool of potential offenders within each respective city, thereby increasing the likelihood that victims and offenders converge in space and time. The end result of this effect would be an increased individual risk of *total* robbery and *total* assault victimization among individuals within the city.

Second, higher city-level gun availability can increase the risk of individual gun victimization. This would occur if increasing city-level gun availability increased the likelihood that potential victims came into contact with *gun-toting* criminal aggressors. Based on the findings of previous research, this would lower the likelihood that the individual victim is injured during the commission of the crime, but increase the likelihood that the victim is killed; thereby representing an *instrumentality* effect. When discussed in the language of opportunity theory, increasing gun availability may not increase the likelihood that motivated offenders and potential victims converge in space and time, but it will increase the likelihood that the motivated offender is carrying a gun. The end result of this effect would not be an increase in individual risk of total assault and total robbery, but an increased risk of individual *gun* assault and *gun* robbery victimization.

Third, increasing city-level gun availability may decrease the risk of individual victimization. This would occur if increasing city-level gun availability deterred potential offenders from carrying out criminal aggression, or if increasing city-level gun availability allowed potential victims to repel or disrupt criminal aggression. From this perspective, awareness of the fact that potential victims may be carrying a gun may cause potential offenders to lose their motivation to offend. The result of this effect would be to lower individual risk of *total* assault and *total* robbery, and *gun* assault and *gun* robbery victimization.

City-level gun availability can also be conceptualized to interact with certain individual behaviors to influence the risk of individual assault and robbery victimization. This is because certain behavior may increase or (decrease) the risk of individual victimization, and exacerbate (or moderate) the direct effects mentioned above. For example, higher city-level gun availability can interact with gender to increase the individual risk of victimization if males are more likely to frequent places where criminal victimizations occur, and as a result, are

more likely to come into contact with individuals who are newly motivated to commit a crime because of greater access to a gun. Under this example the facilitation effects explained above would be exacerbated by the fact that the victim was a male. Additionally, city-level gun availability can interact with how frequently an individual spends the evening away from home if going out nightly increases the chances that the potential victim comes into contact with an aggressor who is armed as a result of higher city-level gun availability. In this example, the instrumentality effects described above would be exacerbated by the fact that the routine activities of the victim put them in closer proximity to motivated offenders. Lastly, city-level gun availability can lower rates of victimization if knowledge of the fact that potential victims may be carrying a firearm reduces offender motivation and potential victims further reduce that risk by not partaking in certain risky behaviors (such as going out nightly). The analysis performed here explores the possibility that gun availability interacts with several important individual risk factors (as spelled out by opportunity theories) to influence individual assault and robbery victimization.

### **Previous Research**

A body of research has emerged regarding the relationship between gun availability and crime. The majority of research on this topic supports the proposition that increased levels of gun availability increase levels of gun crime and violent crime. However, concerns about the methodological quality of some of these studies, and the existence of research that finds null effects or a negative relationship has led some to characterize the findings from this research as mixed (Kleck, 1997).

Although scholars continue to disagree about the nature of the gun-crime relationship, there is at least strong evidence that the use of guns intensifies violence; thereby suggesting a weapon instrumentality effect. For instance, several macro-level studies have found a significant positive relationship between levels of gun availability and rates of homicide (Brearley, 1932; Brill, 1977; Centerwall, 1991; Cook and Ludwig, 2006; Duggan, 2001; Fischer, 1969; Hemenway and Miller, 2000; Hemenway, 2004; Hoskin, 2001; Kaplan and Geling, 1998; Killias, 1993ab; Killias, 1993ba; Kleck, 1979; Krug, Powell, and Dahlberg, 1998; Lester, 1988; McDowall, 1991; Miller, Azrael, and Hemenway, 2002b; Phillips, Votey, and Howell, 1976; Sloan et al., 1988; Sorenson and Berk, 2001). To the extent that these homicides represented assaults and/or robberies where the initial intention of the aggressor was somewhat ambiguous, and an escalation in the conflict

resulted in the killing of the victim, the presence of a gun during this altercation likely increased the probability of the victim's death.

The degree to which the findings from these studies reveal an instrumentality effect, however, has been challenged for three reasons. First, some of these studies failed to account for possible simultaneity between gun availability and homicide (Kleck, 1997).<sup>1</sup> Second, several other studies have found no such relationship between gun availability and homicide (Bordua, 1986; Kleck, 1984; Kleck and Patterson, 1993; Magaddino and Medoff, 1984). Additionally, some have argued a statistically significant relationship between gun availability and homicide is not evidence of a weapon instrumentality effect, but instead a reflection of the greater motivation of people within certain macro-units to kill or seriously injure others (Wolfgang, 1958).

Support for a weapon instrumentality effect also has been found in research examining the relationship between offender possession of a weapon and the likelihood that a victim is killed during the commission of a crime (Cook, 1987; Kleck, 1991; Wells and Horney, 2002; Zimring, 1968; Zimring, 1972). Zimring (1968), for example, compared the probability of homicide in assaults that involved guns to the probability of homicides in assaults that involved knives. Zimring (1968:728) found that "the rate of knife deaths per 100 reported knife attacks was less than 1/5 the rate of gun deaths per 100 reported gun attacks." Noting that 70 percent of all gun killings in Chicago involved single gunshot wounds to victims, Zimring (1968) interpreted the results of this study to suggest that the most homicides were ambiguously motivated assaults that resulted in a lethal outcome due to the presence of a gun. Cook (1987) examined similar causal processes but focused on robberies rather than assaults. Cook found that murder robbery rates were more sensitive to variations in gun robbery rates than non-gun robbery rates. This led him to conclude that many homicides were an intrinsic by-product of robbery, where the initial intention of the aggressor was not to kill the victim, but the escalation of the conflict and the presence of a gun led to a lethal outcome.

More recently, research examining the relationship between gun possession and the outcome of a crime has been extended to also account for the probability of attack and injury. For example, Kleck and McElrath (1991) found that crimes committed with guns are less likely to result in attack or injury than crimes committed without a weapon or a weapon besides a gun, but more likely to result in death or serious injury if an attack occurred (for a detailed review see Kleck, 1997). The findings from

Kleck and McElrath (1991) were substantiated by a recent study by Wells and Horney (2002) who also found that weapon instrumentality effects remained significant even after controlling for the intentions of the aggressor.

Support for instrumentality effects have also been found in case-control studies (Bailey, et al., 1997; Cummings and Koepsell, 1998; Dahlberg, Ikeda, and Kresnow, 2004; Kellerman et al., 1993; Wiebe, 2003a; Wiebe, 2003b). With a few notable exceptions (see Cummings and Koepsell, 1998), most of these studies found a strong association between having a gun in the home and the risk of homicide. For instance, Kellerman et al. (1993) found that keeping guns in the home was associated with a higher risk of homicide victimization. Additionally, Wiebe (2003a) found that keeping a gun in the home increased the risk of unintentional gunshot fatality. It should be noted, however, that skepticism about these findings has emerged. Cummings and Koepsell (1998) point out that methodological limitations associated with case control studies make it difficult to draw definitive conclusions from the results.

Research examining weapon facilitation effects has received less attention and, overall, has not received much support in the research literature. A small number of experimental studies have found support for the proposition that the presence of guns elicits violent aggression (Berkowitz and Lepage, 1967; Leyens and Parke, 1975; Page and O'Neal, 1977). The results of these studies, however, have come under scrutiny. Several other studies have found no weapons effect (Buss, Booker, and Buss, 1972; Ellis, Weinir, and Miller III, 1971; Page and Scheidt, 1971). Additionally, at least two other studies have found that the presence of a gun may inhibit, rather than facilitate, aggressive behavior (Fraczek and Macauley, 1971; Turner, Layton, and Simons, 1975). There is also some doubt about whether the findings from these experiments will have the same outcome when applied to real world settings. Some observers have suggested that the support for the weapon facilitation hypothesis seems to decline with increasing levels of realism in the experiments (Kleck and McElrath, 1991).

Additional evidence of lack of support for weapon facilitation effects can be found in macro-level studies that examine the relationship between gun availability and rates of violent crime. When applied to the cross-national level, the weapon facilitation hypothesis would suggest that macro-units with higher levels of gun availability will have higher rates of violent crime (as opposed to gun crime or homicide). This proposition has not been supported in literature (Cook and Moore, 1999). Research has found that gun availability has not been

found to influence overall rates of violent crime (Kleck and Patterson, 1993).

At least two studies have found evidence to support the claim that increasing gun availability decreases crime (Lott, 2000; Lott and Mustard, 1997). These findings held under multiple model specifications, but increasingly have come under attack due to concerns about methodological weaknesses (Duggan, 2001; Ludwig, 1998; Maltz and Targonski, 2002; Martin and Legault, 2005; Rubin and Dezhbakhsh, 2003; Zimring and Hawkins, 1997a). For example, two studies have taken issue with the use of state and county-level UCR cross-sectional time series data in Lott's (2000) analysis (Maltz and Targonski, 2002; Martin and Legault, 2005). Another study (Rubin and Dezhbakhsh, 2003) has argued that the Lott's (2000) use of dummy variables to model the effects of concealed weapons permit laws was inappropriate and led to the model misspecification. Finally, at least one study found that the manner in which gun availability influences crime was contingent upon whether gun possession is legal or illegal. Stolzenberg and D'Alessio (2000) found that the illegal possession of firearms increased violent crime but that legal possession of firearms had no such effect.

Cross-national research on guns and crime has been small in number and has yielded contradictory results (Hemenway and Miller, 2000; Hoskin, 2001; Killias, 1993a; Killias, 1993b; Killias, van Kesteren, and Rindlisbacher, 2001; Kleck, 1997; Krug, Powell, and Dahlberg, 1998). Most of this research has involved the analysis of correlation coefficients using data from a relatively small number of countries. Consequently, results from this research are extremely sensitive to the influence of outliers. As a result, the omission or inclusion of one or two nations can tremendously change the results. This has led some, such as Kleck (1997), to conclude that cross-national research provides no evidence of an association between gun availability and violent crime, while others contend otherwise (Hemenway and Miller, 2000; Hemenway, 2004). It appears that this issue will not be addressed until cross-national multivariate analyses examine the relationship between gun availability and crime. Hoskin (2001) found that gun availability significantly influenced homicide at the cross-national level, and that these effects held when controlling for potential simultaneity between gun availability and homicide. However, more research is needed on this issue before definitive conclusions can be drawn.<sup>2</sup>

Despite the gains made by previous macro-level research that examines the relationship between gun availability and crime, several important issues have not been adequately addressed. First, no study to date has

examined whether the level of gun availability within a macro-unit accounts for crime victimization among the *individuals* residing in those macro-units. Second, no study to date has tested the possibility that city levels of gun availability interact with individual risk factors to influence the risk of individual assault and robbery victimization. Third, the relationship between gun availability and crime victimization in developing nations has not been explored. Fourth, no cross-national study has examined whether gun availability influences crimes other than homicide. These issues are addressed in this study.

## **Methodology**

### *Data*

Data for this study are drawn from the 1996 and 2000 waves of the International Crime Victimization Survey (ICVS).<sup>3</sup> This survey is administered by the United Nations Interregional Crime and Justice Institute. Originally designed to provide an alternative to official police counts of crime, the ICVS is currently the most far reaching and reliable source of comparable crime victimization data in different nations. For each wave, the ICVS provides nation-level data for developed nations and city-level data for the largest city of the developing nations included in the sample.

This study uses only ICVS city-level data from predominately developing nations for several reasons. First, due to the differences in sample design, ICVS data cannot be used to compare variation in crime victimization between developed and developing nations. Analyses of ICVS data are limited to examining developed and developing nations separately. As such, researchers must choose between examining the ICVS nation-level data—which focuses primarily on Western developed nations—or ICVS city level data—which focuses on cities in developing nations. Second, hierarchical linear modeling (HLM) requires a large to moderate number of level 2 (macro-level) observations to perform a multi-level analysis. More level 2 observations are available using the city-level data from developing nations rather than the nation-level data from developed nations. Third, the theoretical arguments made in this study pertaining to the relationship between guns and crime are more likely to operate at the city-level, rather than the national level. Fourth, no study to date has examined the relationship between gun availability and individual crime victimization in cities in developing nations.

ICVS city-level data were collected using face to face interviews.<sup>4</sup> Interviews were translated to the local

language by experts from the host country familiar with criminology, survey methodology, the local language, and English, Spanish or French (original interviews were created in these three languages). Nations were asked to collect between 1000 and 1500 interviews. Most countries depended on an ad hoc group of interviewers (sometimes consisting of senior level students) for collection of data.

Sampling for the face to face interviews was generally hierarchical. It began with identifying administrative areas within the city, followed by a step-by-step procedure aimed at identifying areas, streets, blocks, and households. Thus, these data are expected to provide a reasonably representative city sample. A randomly chosen member of each household, above the age of 16, was interviewed and asked about his/her experiences with crime victimization. When deemed necessary, efforts were made to match interviewers and respondents in a manner deemed culturally appropriate for that specific locale. Although they represent the best available, there are limitations to these data. For instance, despite the fact that efforts were made to standardize sampling and ensure generalizability, it is possible that certain subpopulations within each city were more likely to be interviewed than others; thereby calling in to question the generalizability of the results from research using ICVS data.<sup>5</sup> In addition, the fact that the interviews were face to face may have decreased the willingness of some respondents to admit that they owned a gun, thereby underestimating the level of gun availability in these cities. In all, the data used in this study consist of 45,913 individuals nested in 39 cities in developing nations.<sup>6</sup> A list of the cities included in these data is provided in Appendix A.

### *Measures*

**Dependent Variables.** Four dependent variables are analyzed: *gun assault*, *assault*, *gun robbery* and *robbery*. Examining the factors that influence individual risk of overall assault and robbery, as well as the individual risk of gun assault and gun robbery, allows for a more precise test of the propositions mentioned above. Respondents were asked if they had been a victim of these crimes in this year or in the previous year. Because violent victimization was a rare phenomenon, these dependent variables were dichotomized with one or more victimization being coded as 1 and no victimization being coded as 0. Descriptive statistics for these measures, and other variables used in this study are reported in Table 1. Appendix A reports the number of respondents that reported being a victim of these crimes in each city.

**Independent Variable.** *Gun availability* is opera-



Table 1. Descriptive Statistics

	Mean	Standard deviation	Minimum	Maximum
<b>City-level variables</b>				
Gun availability	9.33	7.56	.86	29.30
Economic inequality	9.50	6.79	2.60	32.10
Sex ratio	83.18	20.11	36.86	134.80
Age structure	45.16	14.03	24.12	76.45
<b>Individual-level variables</b>				
Male	.44	.50	.00	1.00
16 to 34	.44	.50	.00	1.00
Low income	.19	.39	.00	1.00
Single	.30	.46	.00	1.00
Neighborhood cohesion	.35	.48	.00	1.00
Out nightly	.13	.33	.00	1.00
College education	.42	.33	.00	1.00
Work/school	.57	.49	.00	1.00
Gun owner	.09	.50	.00	1.00
Gun robbery	.01	.49	.00	1.00
Robbery	.05	.28	.00	1.00
Gun assault	.01	.26	.00	1.00
Assault	.07	.10	.00	1.00

tionalized as the percentage of respondents in the city who reported owning a firearm. This measure was created by aggregating the number of individuals in each city that reported owning a firearm and dividing this number by the total number of respondents for each city. The use of aggregated measures of gun ownership such as this one is common in research examining the relationship between firearms and crime. A recent study by Kleck (2004) found that aggregated measures of gun ownership provide a relatively reliable indicator of gun availability for macro-level aggregates. Despite this fact, this measure has some limitations. First, this measure only taps one of the three dimensions of gun availability. This measure does not assess gun law regulations or informal transfer of gun ownership. It is assumed here that a high level of gun ownership indicates high levels of gun availability in each respective city. Another limitation of this measure is that, for some cities, the number of gun owners was quite small. Thus, it is possible that measurement error is a problem with this indicator of gun availability.

Overall, gun ownership across the sample of cities was relatively modest. On average, 9.3 percent of respondents in each city reported owning a gun. There was, however, some interesting variability. For instance, only about 1.5 percent of residents in Seoul, Korea reported owning guns. On the other hand, 18.3 percent of residents in Johannesburg, South Africa and 29.3 percent of residents of Asuncion, Paraguay reported owning guns. Levels of gun ownership for each city are also reported in

Appendix B.

**Control Variables.** Several standard control variables were included in this study. At the city level, *economic inequality* was operationalized as the ratio of income or consumption of the richest 20 percent to the poorest 20 percent for the nation in which the city was located. This variable was included because previous research has found economic inequality to be the most robust predictor of crime at the cross-national level (Braithwaite and Braithwaite, 1980; Krahn, Hartnagel, and Gartrell, 1986; Messner, 1980; Messner, 1989; Messner and Rosenfeld, 1997; Rosenfeld and Messner, 1991; Unnithan, et al., 1994). Data for this measure were taken from the *World Development Report 2000*. A nation-level indicator of economic inequality was used because reliable city measures of economic inequality were not available for the cities included in this study. It was assumed that the level of economic inequality at the national level served as a reasonable proxy of the actual level of economic inequality for cities within those respective nations.

Sex ratio and age structure were also included as controls because previous macro-level and cross-national research has found these variables to significantly influence crime (Avakame, 1999; Messner, 1989; Pampel and Gartner, 1995). *Sex ratio* was an indicator of the number of men per 100 women in the population. This measure was operationalized as the proportion of men surveyed in each city divided by the proportion of women surveyed in each city, multiplied by 100. *Age structure*

represents the proportion of people in each city between the ages of 16 and 34.

Individual-level control variables were included in this study in consideration of the individual-level risk factors that increase the likelihood of crime victimization (Hindelang, Gottfredson, and Garafolo, 1978). *Age* was included as a control variable because research has found that younger people are more likely to be the victims of violent crime. Individuals between the ages of 16 and 34 were coded 1 for the age variable and individuals ages 35 and above were coded 0. *Male* was included as a control because men have been found to be much more likely to be victims of violent crime than women. Males were coded 1 for this variable and females were coded 0. Research has found that individuals who are single are more likely to be the victims of crime because they spend less time under the guardianship of others (Hindelang, Gottfredson, and Garafolo, 1978). *Single* was operationalized so that individuals who were never married and not cohabiting were coded 1 and all other individuals were coded as 0. A control variable was also included for the respondent's income level. Individuals whose income was below the twenty-fifth percentile for the nation in which they lived were considered *low income* and were coded as 1. All other respondents were coded 0 for the low income measure.

*Education level* was also included as a control variable in this analysis. Individuals with at least some college education were coded 1 and individuals without any college education were coded 0 (Meithe, Stafford, and Long, 1987). *Out nightly* was an indicator of how often the respondent reported going out in the evening. Individuals who reported going out every night were coded as 1 and all other respondents were coded as a 0. *Neighborhood cohesion* measured the level of social support the individual received from the community in which they lived. Individuals who reported that the people in their community mostly help each other were coded as 1 and all other respondents were coded as 0. This item was included because Lee (2000) found that people who live in neighborhoods which they perceive to be cohesive have lower rates of violent victimization. *Work/school* was coded so that individuals who reported working or going to school (as opposed to being unemployed or staying home) were coded as 1 and all other respondents were coded as 0. *Gun Owner* was an indicator of whether or not the respondent owned a gun. Gun owners were coded as 1 and respondents who did not own a gun were coded as 0.

#### *Analytic Technique*

Hierarchical linear modeling (HLM) is used to perform the analyses in this study. HLM is ideal because it accounts for the non-independence of observations nested within cities (Hox 2002; Raudenbush and Bryk, 2002). This technique calculates coefficients as a function of the city context, thereby allowing the researcher to ascertain the manner that both city-level and individual-level factors influence individual crime victimization. In addition, HLM allows for the partitioning of variance among within-city and between-city components. Furthermore, HLM makes it possible to explore for cross-level interactions between city-level and individual-level processes. One limitation of HLM is that it can not test for simultaneity between independent and dependent variables.<sup>7</sup> As a general rule, research using nested or hierarchical data structures assumes that level 2 effects influence level 1 individual outcomes, but level 1 effects, when taken in isolation, do not account for variation in level 2 outcomes. This assumption, however, is not sufficient to rule out simultaneity between city levels of gun availability and individual victimization.

Initially, attempts were made to compensate for this limitation by performing a supplementary path analysis. Unfortunately, path analysis cannot test reciprocal relationships with a model that includes dichotomous dependent and independent variables because this causes the model to become internally inconsistent (Maddala, 1983). As such, this study is unable to test for a reciprocal effect between gun availability and crime victimization. Despite this limitation, this study is the first to examine the relationship between city-level gun availability and individual crime victimization. Further, the research performed here represents the best available option when considering the current methodological constraints. Greater explanation of the HLM models tested here are included in Appendix C.

#### **Results**

Table 2 reports the results for the HLM analysis with gun robbery included as the dependent variable. Column 1 of Table 2 presents the results from the unconditional model. This model is estimated without any level 1 or level 2 predictors and is useful for estimating the average log odds of gun robbery victimization across cities ( $\gamma_{00}$ ) and assessing the magnitude of between city variation in gun robbery victimization ( $\tau_{00}$ ) (Raudenbush and Bryk, 2002). The average log-odds of gun robbery victimization across cities is -5.453. This translates to an odds ratio of .004; thereby suggesting that in a city with a typi-

**Table 2. Multi-level Estimates for Gun Availability and Other Variables on Gun Robbery Victimization**

	Model 1 (baseline model)		Model 2 (full model)	
	<i>B</i>	<i>Odds ratio</i>	<i>B</i>	<i>Odds ratio</i>
Intercept	-5.453 **	.004	-6.260 **	.002
City-level variables				
Gun availability	—	—	.054 *	1.055
Economic inequality	—	—	.128 **	1.137
Sex ratio	—	—	.019 *	1.020
Age structure	—	—	.005	1.005
Individual Level Variables				
Male	—	—	.841 **	2.319
16 to 34	—	—	.181	1.198
Low income	—	—	.152	1.165
Single	—	—	.242 *	1.274
Neighborhood cohesion	—	—	-.231 *	.794
Out nightly	—	—	.056	1.057
College education	—	—	.325 **	1.383
Work/school	—	—	.047	1.048
Gun owner	—	—	.211	1.235
Intraclass Correlation	.422			
* p < .05    ** p < .01				

cal gun robbery rate the expected odds of individual gun robbery victimization is .004.

The variance in city average log odds of gun robbery is 2.403. Knowledge of the variance between cities in city average log odds of gun robbery also makes it possible to calculate the intra-class correlation. This statistic represents the proportion of the variance in the outcome that is between groups.<sup>8</sup> The intra-class

correlation is .422. An intra-class correlation of this size is quite substantial for an HLM model. This suggests that 42 percent of the variation in the odds of individual gun-robbery victimization is explained by city-level factors. Importantly, this also suggests that the odds of gun robbery victimization vary across cities.

Column 2 of Table 2 reports the coefficients for the full model with gun robbery as the dependent variable.

**Table 3. Odds Ratios for Models Examining the Cross-level Interactions that Influence Gun Robbery Victimization**

	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Intercept</b>	.002 **	.002 **	.002 **	.002 **	.002 **
<b>City-level variable</b>					
Gun availability	1.094 **	1.104 **	1.096 **	1.085 *	1.100 **
<b>Individual Level Variables</b>					
Male	2.373 **	2.520 **	2.372 **	2.377 **	2.368 **
Single	1.411 **	1.410 **	1.440 **	1.415 **	1.415 **
Neighborhood cohesion	.799 *	.799 *	.799 *	.727 **	.801 *
College	1.405 **	1.400 **	1.406 **	1.396 **	1.454 **
<b>Cross-level interactions</b>					
Gun availability x male	—	.986	—	—	—
Gun availability x single	—	—	.995	—	—
Gun availability x neighborhood cohesion	—	—	—	1.028*	—
Gun availability x college	—	—	—	—	.990
* <i>p</i> < .05    ** <i>p</i> < .01					



Gun availability significantly influences individual gun robbery victimization. Holding constant all other predictors in the model and the random effect, a unit increase in gun availability increases the odds of gun robbery victimization by 1.055 times or 5.5 percent. These results can also be interpreted in reference to changes in the odds of victimization with a standard deviation change in the independent variable. The standard deviation of gun availability is 7.6. Therefore, holding constant all other predictors in the model and the random effect, a 1 standard deviation increase in gun availability is associated with a relative odds change of 1.504 or a 50.4 percent increase in the odds of gun robbery victimization.

Several of the control variables included in this analysis are significantly associated with individual gun robbery victimization. At the city level, a unit increase in economic inequality increases the odds of individual gun robbery victimization by 13.7 percent. In addition, the sex ratio significantly influences individual gun robbery victimization. A unit increase in the number of males per 100 females increases an individual's odds of gun robbery victimization by 2.0 percent. At the individual level, the odds of being a victim of gun robbery are 131.9 percent higher for males than females, 27.4 percent higher for singles than non-singles, 38.3 percent higher for people who are college educated, and 20.6 percent lower for individuals who report living in a neighborhood with

high levels of cohesion.

Table 3 reports the odds ratios for the models that explored the possibility that the gun availability interacts with individual risk factors to influence individual gun robbery. Initially, attempts were made to run these models with all of the variables from the full model reported in Table 2. However, problems associated with model-fit and multicollinearity were encountered. In an attempt to isolate the effects of a cross-level interaction on individual gun robbery victimization, a series of reduced models were examined. In each of the models gun availability was included as the level 2 indicator and the individual risk factors that significantly influenced gun robbery victimization in the full model reported in Table 2 were included as level 1 indicators. Model 1 of Table 3 reports the baseline reduced model without any interaction terms included. A cross-level interaction term between gun availability and one of the individual risk factors is examined in each of the following models. Gun availability significantly interacts with neighborhood cohesion to influence individual gun robbery victimization, but this finding is somewhat counterintuitive. This finding suggests that as gun availability increases, the risk of gun robbery victimization increases at a higher rate for individuals living in neighborhoods with high levels of cohesion than for individuals living in neighborhoods with lower levels of cohesion.

**Table 4. Multi-level Estimates for Gun Availability and Other Variables on Robbery Victimization**

	Model 1 (baseline model)		Model 2 (full model)	
	B	Odds ratio	B	Odds ratio
<b>Intercept</b>	-3.238 **	.039	-3.502 **	.030
<b>City-level variables</b>				
Gun availability	—	—	.018	1.011
Economic inequality	—	—	.057 *	1.058
Sex ratio	—	—	.000	1.000
Age structure	—	—	.011	1.011
<b>Individual Level Variables</b>				
Male	—	—	.195 **	1.215
16 to 34	—	—	.247 **	1.280
Low income	—	—	-.017	.983
Single	—	—	.248 **	1.281
Neighborhood cohesion	—	—	-.207 **	.813
Out nightly	—	—	.113	1.120
College education	—	—	-.048	.953
Work/school	—	—	.048	1.049
Gun owner	—	—	.138	1.148
<b>Intraclass Correlation</b>	.200			

\* p < .05    \*\* p < .01

**Table 5. Multi-level Estimates for Gun Availability and Other Variables on Gun Assault Victimization**

	Model 1 (baseline model)		Model 2 (full model)	
	<i>B</i>	<i>Odds ratio</i>	<i>B</i>	<i>Odds ratio</i>
<b>Intercept</b>	-5.229 **	.005	-6.038 **	.002
<b>City-level variables</b>				
Gun availability	—	—	.083 **	1.086
Economic inequality	—	—	.048	1.049
Sex ratio	—	—	.000	1.000
Age structure	—	—	.013	1.013
<b>Individual Level Variables</b>				
Male	—	—	.874 **	2.397
16 to 34	—	—	.174	1.190
Low income	—	—	.470 **	1.599
Single	—	—	.130	1.139
Neighborhood cohesion	—	—	-.039	.962
Out nightly	—	—	.381 **	1.464
College education	—	—	.151	1.164
Work/school	—	—	-.104	.902
Gun owner	—	—	.398 **	1.489
<b>Intraclass Correlation</b>	.299			

\*  $p < .05$     \*\*  $p < .01$

Table 4 reports the results for the HLM analysis with robbery included as the dependent variable. Column 1 of Table 4 tests the unconditional model. These findings suggest that for a city with a typical robbery victimization rate, the expected odds of an individual being a victim of robbery are .039. The intra-class correlation is .200. This suggests that 20 percent of the variance in the log odds of individual robbery victimization is explained by city-level processes.

Column 2 in Table 4 reports the results for the full model with robbery victimization as the independent variable. Gun availability does not significantly influence individual robbery victimization. Several of the control variables included in the model, however, are significantly associated with individual robbery victimization. At the city level, economic inequality exhibits significant effects on robbery victimization. For every 1 unit increase in economic inequality the odds of robbery victimization increase by 1.058 or by 5.8 percent. At the individual level, males have 21.5 percent higher odds of being victims of robbery than females, individuals between the ages of 16 to 34 have 28 percent higher odds of being victims of robbery than individuals 35 and older, and singles have 28.1 percent higher odds of being a robbery victim than someone who is married, widowed, or cohabiting. Additionally, the odds of individual robbery

victimization are 18.7 percent lower for a person who reports living in a neighborhood with high levels of cohesion than someone who does not report living in such a neighborhood. In addition to the models reported in Table 4, additional models were run that examined the possibility that gun availability interacts with individual risk factors to influence overall robbery victimization. None of these models yielded statistically significant relationships.

Table 5 reports the HLM results with gun assault victimization as the dependent variable. Column 1 in Table 5 reports the results from the unconditional model. In a city with average gun assault victimization the expected odds of an individual being a victim of gun assault are .005. The intra-class correlation is .299, thereby suggesting that nearly 30 percent of the variance in individual gun assault victimization is accounted for by city-level processes.

Column 2 of Table 5 reports the full model with gun assault included as the dependent variable. These results show that the level of gun availability has a significant positive association with individual gun assault victimization. Holding constant all other predictors in the model and the random effect, a unit increase in gun availability increases the odds of individual gun assault victimization by 1.086 times. These results suggest that a 1 standard

**Table 6. Odds Ratios for Models Examining the Cross-level Interactions**

	Model 1	Model 2	Model 3	Model 4
<b>Intercept</b>	.003 **	.003 **	.003 **	.003 **
<b>City-level variable</b>				
Gun availability	1.107 **	1.115 **	1.103 **	1.116 **
<b>Individual-level variables</b>				
Male	2.381 **	2.534 **	2.378 **	2.369 **
Low income	1.530 **	1.533 **	1.416 *	1.517 **
Out nightly	1.553 **	1.551 **	1.561 **	1.988 **
Gun owner	1.491 **	1.493 **	1.492 **	1.497 **
<b>Cross-level interactions</b>				
Gun availability x male	.990	—	—	—
Gun availability x low income	—	1.019	—	—
Gun availability x out nightly	—	—	.958 **	—

\*  $p < .05$  \*\*  $p < .01$

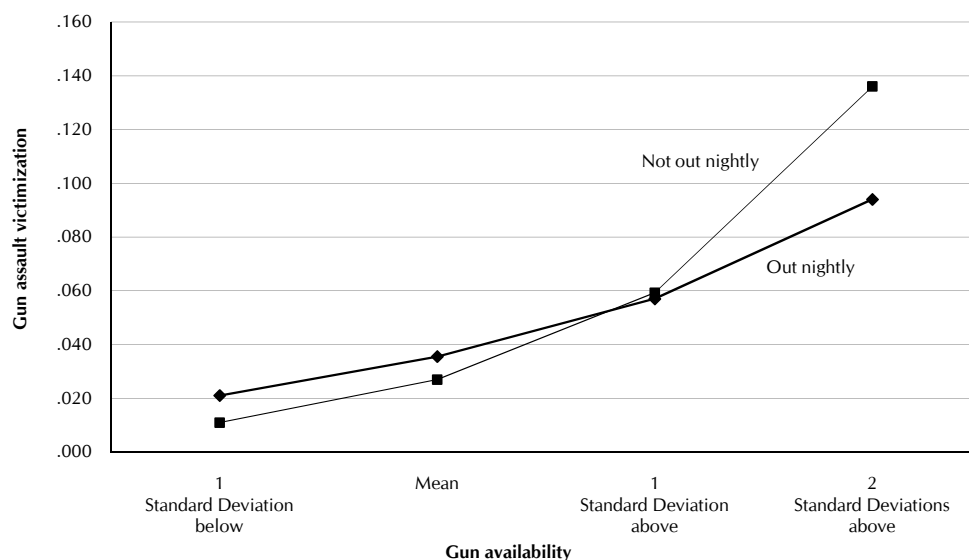
deviation increase in gun availability is associated with a relative odds change of 1.872 or an odds increase of 87.2 percent.

Several of the control variables included in this model are significantly associated with individual gun assault victimization. At the individual level, the odds of gun assault victimization are 139.7 percent higher for males than females, 59.9 percent higher for individuals who are low income, and 46.4 percent higher for individuals who report going out nightly. The results also suggest that individual gun ownership is positively associated with the odds of gun assault. These results, however, should

be viewed cautiously because it is plausible that there is a reciprocal relationship between *individual* gun ownership and *individual* victimization that is not accounted for in this analysis.

Table 6 reports the odds ratios for the models that explore the possibility that gun availability interacts with individual risk factors to influence individual gun assault victimization. Model 4 in Table 6 shows that gun availability interacts with *out nightly* to influence gun assault victimization. As shown in Figure 1, it appears that going out nightly increases the risk of individual gun assault in cities with average and low levels of gun availability. On

**Figure 1. Cross-level Interactions for the Effects of Gun Availability and Nightly Behavior on Odds of Gun Assault Victimizations**



**Table 7. Multi-level Estimates for Gun Availability and Other Variables on Assault Victimization**

	Model 1 (baseline model)		Model 2 (full model)	
	<i>B</i>	<i>Odds ratio</i>	<i>B</i>	<i>Odds ratio</i>
<b>Intercept</b>	-2.686 **	.068	-3.134 **	.043
<b>City-level variables</b>				
Gun availability	—	—	.012	1.013
Economic inequality	—	—	.028 *	1.028
Sex ratio	—	—	.002	1.002
Age structure	—	—	.018 **	1.018
<b>Individual Level Variables</b>				
Male	—	—	.348 **	1.417
16 to 34	—	—	.350 **	1.419
Low income	—	—	.195 **	1.215
Single	—	—	.320 **	1.378
Neighborhood cohesion	—	—	-.184 **	.832
Out nightly	—	—	.336 **	1.399
College education	—	—	-.135 **	.874
Work/school	—	—	-.010	.990
Gun owner	—	—	.199 **	1.220
<b>Intraclass Correlation</b>	.117			
	* <i>p</i> < .05    ** <i>p</i> < .01			

the other hand, individuals in cities with high levels of gun availability have a lower risk of gun assault victimization if they go out nightly.

Table 7 reports the results of the HLM analysis with assault included as the dependent variable. The results from the unconditional model are reported in Column 1 of Table 7. In a city with an average rate of assault victimization the expected odds of victimization are .068. The intra-class correlation suggests that 11.7 percent of the variation in individual-level assault victimization is explained by city-level processes.

Column 2 of Table 7 reports the HLM results of the full model with assault included as the dependent variable. These results show that gun availability does not influence individual assault victimization. Several of the control variables included in this analysis, however, are significantly associated with individual assault victimization. One unit increase in economic inequality is associated with a 1.028 relative odds increase of assault victimization. This corresponds to a percentage increase of 2.8. In addition, the odds of individual victimization are higher in nations with a larger percentage of the population between the ages of 16 to 34. At the individual level, the odds of assault victimization are 41.7 percent higher for males than females, 41.9 percent higher for individuals between the ages of 16 to 34, 21.5 percent

higher for individuals with low incomes, 37.8 percent higher for singles, and 39.9 percent higher for individuals who report going out nightly. Furthermore, the odds of assault victimization are 16.8 percent lower for individuals who report living in a neighborhood with high levels of cohesion and 12.6 percent lower for individuals with a college education.

In addition to the models reported in Table 7, several models were run that examined the possibility that gun availability interacts with individual risk factors to influence overall assault victimization. Only one of these interactions was found to be significant; gun availability interacts with neighborhood cohesion to influence individual assault victimization. This finding, however, is counterintuitive because it indicates that individuals in neighborhoods with high levels cohesions have a higher risk of gun assault victimization than individuals in neighborhoods with low levels of cohesion. The implications of these findings are discussed below.

## Discussion and Conclusion

This study examined the relationship between city levels of gun availability and the individual odds of assault and robbery victimization. These results suggest that city gun availability does matter when it comes to

explaining individual odds of gun victimization, but not individual odds of total robbery and total assault victimization. These results are consistent with previous macro-level research that suggests that the greater availability of guns will make it more likely that guns will be used in assaults and robberies (see Cook and Moore, 1999). It appears that in cities with high levels of gun availability, a larger number of residents have access to guns which, in turn, increases the risk of gun crime victimization for individual city residents. These results lend support to a weapon instrumentality effect rather than a facilitation effect. From these results we can conclude that assaults perpetrated in cities with high levels of gun availability *may* be more likely to end in serious injury or death than assaults carried out in cities with lower levels of gun availability. Furthermore, we can also conclude that robberies carried out in cities with high levels of gun availability *may* be more deadly and involve more lucrative targets than robberies carried out in cities with lower levels of gun availability. Stated differently, if gun availability levels influence individual odds of gun crime victimization, and the use of a gun during the commission of a crime influences the target of a crime and its outcome, then it should be safe to conclude that gun availability levels indirectly effect the target of a crime and its outcome.<sup>9</sup> Importantly, these results do not lend support to Lott's (2000) controversial thesis that increasing gun availability reduces crime.

The results from this study also reveal the importance of considering social context when attempting to understand individual risk of gun victimization. Level 2 indicators explained more than 30 percent of the variation in individual victimization. Although there is no way to determine the extent to which this variation was accounted for by gun availability, based on the odds ratios reported in these models, it is fair to say that it was probably substantial. Thus, it is fair to conclude that city-level gun availability is an important determinant of individual gun crime victimization.

Another important finding from this study is that individual behaviors are important predictors of individual gun crime victimization. In all of the models tested here, individual risk factors played a more important role than city-level factors in influencing victimization. This suggests that, although social context is important, individual behavior may still be the most important predictor of crime victimization. More research is needed on this issue before definitive statements can be made about the predictive power of macro-level factors, relative to individual factors, in influencing gun crime. The use of more precise macro-level measures may or may not

yield increased explanatory power. Rather than pitting macro- and micro-level predictors against one another, it may be best to see each as complementary pieces of a complex puzzle.

Little support was found for the proposition that city-level gun availability interacts with individual risk factors to influence individual assault and robbery victimization. Only three of the cross-level interactions examined were found to be significant, and two of those cross-level interactions represented counterintuitive relationships. More work is needed, however, before definitive conclusions are made about the nature of this relationship.

An additional finding that emerges from this analysis is that gun availability is linked to gun crime victimization in *developing* nations. These findings reveal that the manner in which guns influence crime is not necessarily unique to the United States or a certain subset of Western developed nations. Instead, it appears that gun availability influences crime in various structural and cultural settings. This lends support to the proposition that gun availability creates conditions that lead to higher levels of gun crime across nations.<sup>10</sup>

Although the conclusions drawn here do provide support that guns influence crime, it should be noted that—due to limitations of multi-level analysis—this study was unable to account for a reciprocal relationship between gun availability and gun crime. As such, the results reported here should be viewed cautiously. In essence, these results suggest that more work is needed that accounts for the relationship between city-level gun availability and individual crime victimization at the cross-national level. No definitive claim can be made about this relationship until possible simultaneity effects are tested in a non-recursive model. Despite the methodological challenges encountered in these analyses, these results have implications for future research and theory on guns and crime.

First, advances in criminological theory are needed to better explain how gun availability operates at the macro-level to influence individual outcomes. This paper represented an initial attempt to integrate existing theory on guns and crime with opportunity theory to provide a richer understanding of the dynamic between guns and crime. Further development is needed with regard to the exact theoretical mechanisms that influence this process. Such an integrated theoretical perspective should be able to account for the role of the social environment in influencing how guns are used while also acknowledging the role of individual agency in influencing victimization outcomes.

The research implications of these findings closely

mirror the theoretical implications. More work is needed that explores potential cross-level interactions between gun availability and the individual risk factors associated with crime victimization. In addition, future research should look to develop macro-level indicators that distinguish between the proportion of the population that uses guns for legal purposes and the proportion of the population that uses guns for illegal purposes. Stolzenberg and D'Alessio (2000) found that illegal gun availability influenced crime but legal gun availability did not. It would be interesting to assess how legal and illegal gun availability influence individual victimization outcomes. Furthermore, future research should also explore the macro-level factors that influence the outcome of gun crimes. For example, it is plausible that gun crimes are more likely to result in death or injury in social environments with high levels of economic inequality.

The results of this study have implications for gun control policy. These results suggest that policy aimed at reducing gun levels may reduce the number of crimes committed with guns.<sup>11</sup> These results also suggest that reducing levels of economic inequality can decrease the motivation to commit gun violence. Finally, the results here suggest that attempts to alter risky behavior potentially could have a substantial impact on the individual crime victimization.

## Endnotes

1. This is a valid criticism, but it should be noted even the studies that have controlled for simultaneity between gun availability and homicide have been unable to establish a consensus on this issue. For example, four of these studies have found a significant relationship between gun availability and homicide (Cook and Ludwig, 2006; Hoskin, 2001; Kleck, 1979; McDowall, 1991) and three others have not (Kleck, 1984; Kleck and Patterson, 1993; Magaddino and Medoff, 1984).

2. As mentioned by one of the anonymous reviewers, Hoskin (2001) may not have a valid instrumental variable. See Hemenway (2004) for a critique of studies that use two stage least squares regression to model possible simultaneity between gun availability and crime.

3. To maximize the number of level 2 units, city-level data from the 1996 and 2000 waves were pooled. The ICVS is different from more traditional longitudinal designs in that every new wave includes cities that had not previously participated in the survey. In the few cases where data were available for cities in both waves, data from the 2000 wave were taken.

4. Data for Ljubljana, Slovenia were collected using CATI.

5. Interestingly, 42 percent of respondents had some college education. Some may find this quite surprising when considering the sample. In reality, it is likely that less than 40 percent of the populations in these large cities received some college educations. What this may suggest is that college educated individuals had a higher probability of being surveyed than those who have not gone to college. This may reflect measurement error and may limit the generalizability of these results.

6. Response rate information for data from developing nations collected in the 2000 wave are not available. Systematic analysis of data collected in 1996, however, suggests that the response rates were very high. In 1996, the average response rates in African, Asian, and Latin American countries was 95 percent while the average response rates in Central and Eastern European countries was 81.3 percent.

7. According to Joop Hox (in a personal email) M-plus can test for simultaneity in multi-level analyses but this requires a large number of groups (100 or more) at the city level.

8. The intra-class correlation traditionally has not been used for HLM analyses using non-linear link functions because the level 1 variance for these functions is heteroscedastic. Snijders and Bosker (1999) provide a formula for calculating the intra-class correlation when using a logit link. This formula is  $p = \tau_{00}/(\tau_{00} + \pi^2/3)$ .

9. Despite these conclusions, caution must be taken not to overstate the implications of these findings as they relate to gun assault or gun robbery outcomes. The relationship between offender possession of a weapon and the outcome of a crime is highly complex and no such tests are performed here. As mentioned above, research has found that crimes committed with guns are less likely to result in an attack but more likely to result in death or serious injury if an attack occurs (Cook, 1987; Wells and Horney, 2002; Zimring, 1968). When the findings from previous research are considered in light of the analysis performed in this study, several questions emerge. First, what will be the overall impact of decreasing city-level gun availability rates on gun robbery and gun assault outcomes? Second, to what extent will reductions in gun assault injuries be offset by increases in injuries from non-gun weapon assaults? Third, to what extent will re-



ductions in gun robbery injuries be offset by increases in non-gun robbery related injuries? Fourth, what does the relationship between other weapon availability (gun, hammer, etc.) and non-gun robbery and non-gun assault look like? These questions illuminate the importance of using caution when assessing the implications of these findings.

10. However, the combined sample may mask distinctions among cities. This point should be viewed cautiously until future multi-level research examines relationships between gun availability and crime across cultural or geographic distinctions.

11. This implication, however, assumes that an aggressive gun control policy will effectively remove gun access from individuals who intend to use them in a criminal manner. Kleck (1997), however, has stated that an aggressive gun control policy is more likely to impact law abiding gun owners than gun-toting criminals.

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**Appendix A. Number of Respondents Reporting  
Victimization by Type of Crime and City**

<b>Nation</b>	<b>Assault</b>	<b>Gun assault</b>	<b>Robbery</b>	<b>Gun robbery</b>
Albania	85	26	89	17
Argentina	105	59	88	59
Azerbaijan	21	2	17	1
Belarus	38	4	23	4
Bolivia	100	3	92	2
Botswana	158	0	52	6
Brazil	77	2	136	130
Bulgaria	49	2	32	2
Colombia	154	32	140	32
Costa Rica	61	10	78	7
Croatia	35	12	20	4
Czech Republic	96	5	30	7
Georgia	30	7	27	2
Hungary	61	3	36	0
India	59	3	22	2
Indonesia	42	0	12	1
Korea	45	0	9	0
Kyrgyzstan	151	3	39	5
Latvia	54	4	45	5
Lesotho	108	22	46	4
Lithuania	96	4	73	0
Macedonia	33	2	11	3
Mongolia	80	1	43	0
Namibia	120	10	93	12
Nigeria	110	15	87	41
Panama	59	14	31	16
Paraguay	36	6	60	2
Philippines	20	4	7	1
Poland	72	2	65	3
Romania	78	1	34	0
Russia	81	12	56	14
Slovakia	40	2	14	1
Slovenia	61	6	22	0
South Africa	194	82	144	129
Swaziland	168	16	93	10
Uganda	139	11	98	15
Ukraine	47	5	66	3
Yugoslavia	100	27	15	7
Zambia	194	7	81	7

**Appendix B. Cities Included in this Study,  
Number of Observations, Number of Gun Owners,  
and Percentage of Gun Owners**

City	Nation	Respondents	Gun owners	
			Number	Percent
Tirana	Albania	1,498	214	14.29 %
Buenos Aires	Argentina	1,000	283	28.30
Baku	Azerbaijan	930	8	0.86
Minsk	Belarus	1,520	84	5.53
La Paz	Bolivia	999	85	8.51
Gaborone	Botswana	1,197	48	4.01 %
Rio de Janeiro	Brazil	1,000	90	9.00
Sofia	Bulgaria	1,505	105	6.98
Bogotá	Colombia	1,016	110	10.83
San Jose	Costa Rica	701	124	17.69
Zagreb	Croatia	1,532	159	10.38 %
Prague	Czech Republic	1,500	140	9.33
Tbilisi	Georgia	1,000	69	6.90
Budapest	Hungary	1,513	73	4.82
Bombay	India	999	12	1.20
Jakarta	Indonesia	1,200	72	6.00 %
Seoul	Korea	2,011	32	1.57
Bishkek	Kyrgyzstan	1,347	147	9.84
Riga	Latvia	1,002	36	3.59
Maseru	Lesotho	1,010	152	15.05
Vilnius	Lithuania	1,526	93	6.09 %
Skopje	Macedonia	700	86	12.29
Ulaanbaatar	Mongolia	1,053	65	6.17
Windhoek	Namibia	1,061	235	22.15
Lagos	Nigeria	1,012	16	1.58
Panama City	Panama	902	106	11.75 %
Asuncion	Paraguay	587	172	29.30
Manila	Philippines	1,500	44	2.93
Warsaw	Poland	1,061	25	2.36
Bucharest	Romania	1,506	27	1.79
Moscow	Russia	1,500	121	8.07 %
Bratislava	Slovak Republic	1,105	37	3.35
Ljubljana	Slovenia	1,260	66	5.24
Johannesburg	South Africa	1,336	245	18.34
Mbabane	Swaziland	1,006	109	10.83
Kampala	Uganda	998	19	1.90 %
Kiev	Ukraine	1,000	59	5.90
Belgrade	Yugoslavia	1,094	313	28.61
Lusaka	Zambia	1,047	94	8.98

### **Appendix C. Explanation of Hierarchical Linear Modeling (HLM)**

HLM was used in the analyses performed in this study. Below is a more detailed explanation of the HLM models examined. The discussion begins with an explanation of how HLM handles dichotomous dependent variables.

To address the dichotomous nature of the dependent variables, HLM creates a logit link function whereby the predicted values of crime victimization are constrained to lie between 0 and 1 (Raudenbush and Bryk 2002). The link function follows a Bernoulli distribution and takes the following form:

$$\begin{aligned}\text{Prob}(\text{VICTIMIZATION}_{ij} = 1 | \beta_j) &= \phi_{ij} \\ \text{Log} [\phi_{ij}/(1-\phi_{ij})] &= \eta_{ij} \\ \eta_{ij} &= \beta_{0j}\end{aligned}$$

where  $i$  indexes individuals and  $j$  indexes city level influences,  $\phi$  is the probability of victimization per trial, and  $\eta$  represents the log of the odds of victimization. The transformed predicted value  $\eta$  is now related to the predictors of the model through the linear structural model.

At the individual-level, the full model tested in these analyses is:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{Male}) + \beta_{2j}(\text{Age}) + \beta_{3j}(\text{Low Income}) + \beta_{4j}(\text{Single}) + \beta_{5j}(\text{Neighborhood Cohesion}) + \beta_{6j}(\text{Out Nightly}) + \beta_{7j}(\text{College Education}) + \beta_{8j}(\text{Work/School}) + \beta_{9j}(\text{Gun Owner}).$$

Note that the individual-level model has no error term because the link function estimates the error term as part of the specification of the error distribution. When the error distribution is binomial, the residual error is a function of the population proportion  $\pi_{ij}$ :  $\sigma^2 = (\pi_{ij}/1-\pi_{ij})$  and, as a result, is not estimated separately (Hox 2002).

The city-level model for the intercept is specified as:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Gun Availability}_j) + \gamma_{02}(\text{Economic Inequality}_j) + \gamma_{03}(\text{Sex Ratio}_j) + \gamma_{04}(\text{Age Structure}_j) + \mu_{0j}$$

where  $\beta_{0j}$  is the intercept term from the individual-level equation, and  $\mu_{0j}$  is the city-level disturbance. This city-level model has the same form as the standard HLM level two model with a normal distribution.

Combining the individual-level and city-level models presents the following mixed model:

$$\begin{aligned}\eta_{ij} = & \gamma_{00} + \gamma_{01}(\text{Gun Availability}_j) + \gamma_{02}(\text{Economic Inequality}_j) + \gamma_{03}(\text{Sex Ratio}_j) + \gamma_{04}(\text{Age Structure}_j) + \\ & \gamma_{10}(\text{Male}_{ij}) + \gamma_{20}(\text{Age}_{ij}) + \gamma_{30}(\text{Low Income}_{ij}) + \gamma_{40}(\text{Single}_{ij}) + \gamma_{50}(\text{Neighborhood Cohesion}_{ij}) + \gamma_{60}(\text{Out Nightly}_{ij}) \\ & + \gamma_{70}(\text{College Educated}_{ij}) + \gamma_{80}(\text{Work/School}_{ij}) + \gamma_{90}(\text{Gun Owner}_{ij}) + \mu_{0j}\end{aligned}$$

For the sake of parsimony, the individual-level (level 1) effects are constrained to be fixed across cities. The city-level variables are centered on the grand mean before being entered into the equation and the individual level variables are left in their dummy variable metric.



## An Integrated Model of Juvenile Drug Use: A Cross-Demographic Groups Study

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**Abstract:** *This study tests the applicability of an integrated model of deviance – social bonding and learning theories – to drug use among a representative sample of U.S. adolescents (12-17 years old). A structural equation model (SEM) was estimated across all subgroups (age, race, and gender) as well as the overall group. The relationships between exogenous variables (social bond and delinquent peer) and endogenous variables (delinquent peer and drug use) were significant and in the hypothesized direction for the overall group and for each subgroup. The results also showed some differences and similarities across demographic groups. The explained variance in substance use ranged from 0.27 to 0.48. Applications for future study are also discussed.*

**Keywords:** social bonding theory; learning theories; drug use; structure equation model.

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### Introduction

The adolescent life-stage is a period of high risk for engaging in many different kinds of problem behaviors, such as substance use (e.g., cigarettes, marijuana, alcohol) and delinquency. Involvement in these acts can place youth at increased risk of future criminal involvement or social maladjustment. Some studies (Elliott 1994; Moffitt 1993; Nagin and Paternoster 1991; Sampson and Laub 1993) have documented that early involvement in antisocial behavior is strongly related to criminality in adulthood.

Among juvenile deviance, drug use is a common phenomenon. A substantial body of research has suggested that involvement in drug use has become a national concern, whether it is alcohol (Barnes 1984; Wechsler et al. 1984), or marijuana use (Smith 1984). Ellickson, Collins, and Bell (1999) have suggested that the use of “hard” drugs (e.g., heroin, cocaine) commonly follows the onset of “gateway” drug use, such as alcohol and marijuana. Moreover, the Office of National Drug Control Policy (ONDCP 2003) has found that youth substance use or abuse can cause many negative consequences, including deviant acts (e.g., early sexual initiation and suicide) and delinquency. For these reasons, identifying and understanding the dynamics underlying youths’ drug use are important.

The present study seeks to assess important social factors in understanding adolescent drug use. A theoretical model of adolescent drug use that integrates central ideas from social control theory (Hirschi 1969) and

learning theories (Sutherland and Cressey 1966; Akers 1973) is formulated and tested. This research does not aim to compare the usefulness of both theories. Rather, it is hoped that by combining the important concepts of learning theory to social control theory, more insights into juvenile substance use can be obtained. Although many studies have employed the same idea to study juvenile drug use (Aseltine 1995; Ellickson, et al. 1999; Marcos, Bahr, and Johnson 1986; Massey and Krohn 1986), this study departs from previous studies in an important way in that the present study applies this integrated model across different demographic groups (e.g., gender, race/gender). In so doing, this study provides insights of the differences of drug use across demographic groups and adds to the information from previous studies which consider important demographic variables as control variables.

### Literature Review

#### *Social Control Theory*

Hirschi’s (1969) social control theory argued that adolescents who had no strong bond to conventional social institutions were more likely to commit delinquency. Many empirical studies that follow Hirschi’s theory have found general support that juveniles who have strong social bonds are involved in fewer delinquent acts (Agnew 1985; Costello and Vowell 1999; Erickson, Crosnoe, and Dornbush, 2000; Hindelang 1973; Hirschi 1969; Junger-Tas 1992; Sampson and Laub 1993; Thornberry et al. 1991). Some studies that specifically employed social control theory to explain juvenile drug use have also found support for this theory (Ellickson et al. 1999; Krohn

et al. 1983; Marcos et al. 1986; Wiatrowski, Griswold, and Roberts 1981). By reviewing these studies, one can find that among the adolescent period (12-17), family and school play influential roles in influencing youngsters' behavior. Whereas a defective family bond increases the probability of youthful drug use or juvenile delinquency (Denton and Kampfe 1994; Wells and Rankin 1991; Rankin and Kern 1994; Radosevich et al. 1980), students who have a weak school bond also have a higher risk of drug use (Ahlgren et al. 1982; Bauman et al. 1984; Radosevich, et al. 1980; Tec 1972).

### *Learning Theory*

Differential association (Sutherland and Cressey 1966) and social learning theory (Akers 1973) were developed in different time periods, but both theories argue that deviant behavior is learned through association with one's original groups (family or peers), which provide pro-deviant definitions and antisocial behavior patterns. Among learning theories' many propositions, the delinquent peer-delinquency association is the most commonly tested proposition. In fact, the effect of differential association with delinquent peers increasing one's delinquent behavior is consistently found in many studies (Akers and Cochran 1985; Akers et al. 1979; Hindelang 1973b; Jensen and Rojek 1992). And, this peer effect has also been found in juvenile substance use in the U.S. (Elliott, Huizinga, Ageton 1985; Marcos, et al. 1986).

### *An Integrated Model of*

#### *Social Control and Learning Theory*

Due to empirical support of both control and learning perspectives of youthful substance use, scholars began to integrate both theories. Although the integrated models vary widely, the common model includes some social control variables (e.g., family bond) and delinquent peer association. This common model has been related to substance use cross-sectionally and longitudinally (Agnew 1993; Erickson et al. 2000; Massey and Krohn 1986; Marcos et al. 1986). One conclusion that can be made after reviewing all these studies is that the integrated model provides a promising future for studying juvenile delinquent behavior in general and drug use in particular (Marcos et al. 1986).

### *The Role of Gender, Race, and Age*

Most criminological and sociological theories of crime and delinquency have concentrated on explaining male deviance. Social control theory (Hirschi 1969), for instance, was developed with direct and exclusive reference to males. Smith (1979) noted that differences

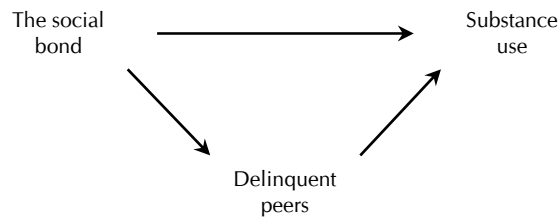
in the volume of deviance between males and females do exist; however, he argued that the major theoretical frameworks provided meaningful explanations of these differences. "It appears unwise to search for specific theories to account for female as distinct from male deviance" (Smith 1979:194). In addition, Segrave and Hastad (1985) concluded that "theories of delinquency, largely developed from male populations, are equally applicable to females." Studies that used social learning and social control theories to explain gender difference in delinquency did support that the two theories help to understand gender gap in crime and delinquency (De Li and Mackenzie 2003; Giordano et al. 1999; Mears, Ploeger, and Warr 1998). Hence, the same process which explains male delinquency should also be valid in explaining female antisocial behavior.<sup>1</sup>

Although race is also a critical variable in studying deviance in general and juvenile drug use, race is often considered as a control variable. Cheung (1990) argued that few empirical studies have provided a theoretical framework on racial/ethnic differences in drug use. While some studies have found that racial differences in adult drug use are partly due to socioeconomic and cultural barriers (Wallace 1999), the extent of applying the adult outcome to a juvenile group is unknown. In addition, whether the process of leading a youth to drug use is different across racial groups is also unclear. Consequently, a theoretical framework that not only explains juvenile drug use but also explicates racial differences is needed.

Several studies have employed social control theory and other theoretical perspectives (e.g., differential association) to study gender differences (Cernkovich and Giordano 1992; Erickson et al. 2000; Jensen and Eve 1976; Smith 1979; Smith and Paternoster 1987; White et al. 1986) or race differences (Matsueda and Heimer 1987) in deviance. Several general conclusions can be drawn from these studies: (1) gender-crime and race-delinquency differences do exist, (2) social control theory can explain the gender and race differences, (3) delinquent peers are very important in understanding race and gender differences in delinquency, and (4) gender and race influence one's exposure to social bonds and delinquent peers, which, in turn, affect deviant involvement.

A more complex issue concerns the effect of gender and race on deviance. Jensen and Eve (1976) argue that a gender difference in delinquency may be race specific (also see Farnworth 1984). Some studies support race specific effects on delinquency across gender groups (Smith and Visser 1980; Young 1980). Watt and Rogers (2007) recently found that the process of alcohol use and abuse among youth was different across race and gender

**Figure 1. Theoretical Model**



groups. Specifically, they found that White females were more likely to be influenced by their peers than Black females. Moreover, Black males were more likely to use alcohol if they lived in a supportive family.

Another important correlate with crime and delinquency is age. Perhaps, the most consistent finding across time, culture, and crime type is that crime peaks in the teenage years and declines thereafter (Gottfredson and Hirschi 1990). Hence, inclusion of age in the study of delinquency and crime is done on a routine basis (Akers and Lee 1999). The age-delinquency relationship can be explained by the variation of social bonding or social learning variables (Akers and Lee 1999; Greenberg 1985, 1994; Warr 2002). Lagrange and White (1985) found social bonding variables had significant effects on delinquency at age 15 and 18 but not 12. Some studies have suggested that the family bond and school bond may have different effects for early teens and older adolescents (Agnew 1985; Dukes and Stein 2001; Friedman and Rosenbaum 1988). While many studies have reported variation in social bonding elements across age stages, Akers and Lee (1999) argue that the underlying mechanism of both bonding and learning theories in explaining substance use remains the same across age groups.

#### *The Present Study*

Few studies have examined for similarities or differences in the correlates of juvenile drug use in gender by race subgroups (see Watt and Rogers, 2007 for exception).<sup>2</sup> Often, the social demographic factors (gender, race, and age) are included in most studies as control variables. Another shortcoming of these studies is that they do not investigate the relationship of background variables to delinquency under an integrated theoretical model matching elements of social control and learning theory. The present study tests the combined model (Figure 1), which integrates both social bonding and delinquent peer association variables, across gender, race, and age subgroups. In addition, the present study followed Costello

and Vowell (1999) who found that the original social bonding elements actually measured a latent variable—social control. Hence, in the present study, social control is treated as a latent variable which is measured by three social bonding elements (family bond, school bond, and involvement). If the model fits the data in all subgroups, one can conclude there is no difference in the procedures of drug use derived from these theories. And by extension, the mainstream criminological theories can be equally applied to different demographic groups.

#### **Method**

##### *Data*

The current study utilizes data from the National Household Survey on Drug Abuse (NHSDA 2001), an interview survey of 68,929 individuals (age 12 years or older) drawn from the civilian, noninstitutionalized U.S. population. The participation rate for NHSDA is about 73 percent. The data were collected through a multistage area probability sample drawn from residents living in the United States. The sample is stratified on many levels, beginning with states. Eight states contributed approximately 3,600 respondents while the remaining states (including the District of Columbia) each contributed about 900 respondents. The sampling procedure and the quality control of the NHSDA have been described fully (Allred et al. 2003).

Each eligible respondent is interviewed in his or her home. Questionnaires about drug use and other sensitive behaviors (e.g., criminal acts) are self-administered using audio computer-assisted self-interviewing (ACASI). The computer-assisted design not only assures the confidentiality, but also increases response rate by systematically checking inconsistent and skipped answers. The final sample which is accessible by the public consists of 55,561 subjects. After weighting according to probability of selection into the study<sup>3</sup> the sample is believed to be representative of the U.S. general population.

The sample for the present study was about 17,429 respondents who were 12 to 17 years old. This subsample represented 31.4 percent of the total sample (55,561). After listwise deletion of missing data (16% of total juvenile sample or  $n = 2,822$ ) the final sample was 14,607.<sup>4,5</sup> Therefore, the final sample for the present study is 14,607 youngsters who completely answered the relevant questions; they represented nearly 83 percent of the total youth subsample.

The sample consisted of 50.4 percent males (7,356) and 49.6 percent females (7,251). Their age ranged from 12 to 17 years, and all of these participants were enrolled in public, or private schools, or in settings that were similar to a normal school setting. Nonwhite youths (Black, Hispanic, and other) accounted for 30.7 percent (4,489) of the total sample, and Whites were responsible for 69.3 percent (10,118) of the respondents.

#### *Drug Use*

The drug use (endogenous variable) of this study is measured by self-reports of the use of five categories of substances—marijuana/hashish (MJ), cocaine (COC), hallucinogens (HAL), inhalants (INH), and alcohol (ALC). Students were asked the frequency of using these five different substances in the past year. Six categories can be chosen from (0=no past year use to 5=use 300-365 days). Due to the skewness of these items, each substance behavior was dichotomized into 2 categories (1=used in the past year; 0=no past year use). The distribution for each substance use is (nonuse vs. use) as follows: 83.9 percent (12,261) vs. 16.1 percent (2,346)—marijuana, 98.3 percent (14,362) vs. 1.7 percent (245)—cocaine, 95.5 percent (13,947) vs. 4.5 percent (660)—hallucinogens, 96.3 percent (14,060) vs. 3.7 percent (547)—inhalants, and 63.8 percent (9,322) vs. 36.2 percent (5,285)—alcohol.

A confirmatory factor analysis was conducted on the dichotomized drug use variable using the Mplus 4.1 statistical modeling program (Muthen and Muthen 2006). The model fits the data very well (CFI=0.999<sup>5</sup>; RMSEA=0.016<sup>7</sup>; TLI=0.998<sup>8</sup>). Therefore, in the final model, these five items were observable indicators measuring a single endogenous latent variable (substance use)<sup>9</sup>

#### *Family Bond*

There are four items from this data set that can be used to measure family bond. These four items ask respondents: how often in the past 12 months did their parents check if they had done their homework, provide help on homework, say they were proud of the respondent, and let the respondent know they had done a good

job? Response options are “1=always,” “2=sometimes,” “3=seldom,” and “4=never.”

An exploratory factor analysis, principal axis factoring with Varimax rotation, on these items revealed a one factor solution (eigenvalue=2.42). Each item loaded significantly on the single factor (ranged from 0.50 to 0.85). The correlation coefficients between pairs of these items are all significant at the 0.01 level. Consequently, family bond is represented by the summation of the responses across the four items ( $\alpha=0.77$ ), with higher scores indicating a weak family bond.<sup>10</sup>

#### *School Bond*

Five questions asked respondents about their feelings towards school. These five items are: liking school, feeling interested in school, feeling meaningful of school work, feeling the importance of school courses, and the frequency of praise from teacher (Cernkovich and Giordano 1992; Junger-Tas 1992; Marcos et al. 1986). Response to each item was coded such that a higher value represented negative feelings about the school and teacher. An exploratory principal axis factor analysis revealed all five items loaded significantly on the one latent factor, which had an eigenvalue of 2.62. The loadings range from 0.48 to 0.76, and the correlation coefficients between pairs of these items are all significant at the 0.01 level. The raw items were summed to form the school bond variable. Youngsters who scored high on school bond had weaker school ties ( $\alpha=0.77$ ).

The foregoing measurement of social bonding variables (family bond and school bond) may seem different from that used in other studies. While many studies (Brezina 1998; Foshee and Hollinger 1996; Simons-Morton et al. 1999; Wells and Rankin 1988) used different variables to capture the concept of social bond (e.g., attachment, commitment), the main proposition of Hirschi's social bonding theory dwelled on relationships between individuals and their various reference groups (e.g., family, school, peers). Hirschi (1969) originally conceptualized each of these bonding institutions as a multidimensional construct. Therefore, although measures of social bond might be different from previous studies, these measures tap the essential meaning of social bond (see footnote 9).

#### *Involvement*

Most studies that test social bonding theory do not usually include involvement. Part of the reason is the conceptual overlap with commitment. However, in the present study, four items that can best describe Hirschi's (1969) involvement are used. According to Hirschi, “the



person involved in conventional activities is tied to appointments, deadlines,... and the like, so the opportunity to commit deviant acts rarely arises" (p. 22). The involvement items ask respondents to report the number of conventional activities, such as religious-related activities and school-related activities, they have attended in the past 12 months.

The EFA (principle axis) revealed a single factor solution (eigenvalue=2.05). The loading of each indicator on the latent construct ranged from 0.45 to 0.79, and each was statistically significant. All the correlations between pairs of items were significant at the 0.01 level. Therefore, in the final analysis, involvement is measured by the summation of the four items. These items were reverse coded so that the higher the score on this variable, the fewer conventional activities the youngster had participated in ( $\alpha=0.68$ ).

While Hirschi (1969) proposed four social bonds, Krohn and Massey (1980) expressed concern regarding the overlap between commitment and involvement. Consequently, they subsumed involvement into commitment, and research that followed usually omitted involvement (Akers and Lee 1999). However, in the present study, the indicators of involvement reflect the original concept of involvement (conventional activities), but they do not coincide with the indicators of school bond (commitment). Therefore, the concern that Krohn and Massey raised would not be a problem here.

Although Hirschi (1969) conceptualized the elements of the social bond as separate, he suggests that these elements are interrelated. Therefore, the present study specified that a latent variable of social control be measured by three social bond elements in the final model. While Hirschi contended that each element of the social bond could influence delinquency independently, the present conceptualization is still consistent with the theory (Costello and Vowell 1999: 823). By and large, social control is an abstract concept that links the more concrete elements of the social bond. Although each of these bonding elements can have an independent effect on delinquency, a model that specifies their collective effects on deviance provides a better test of the theory. Stated differently, if the latent variable of social bond does not fit the data, the assertion of inter-correlation among these social bonding elements is questionable.

#### *Delinquent Peers*

The index of a deviant peer association is reflected in four items. The four questions ask respondents about the proportion of students who use various drugs in their grade in school. Although the four indicators do not ask

respondents directly about their "friends" substance use, it seems likely that students who report other students' drug use behavior have knowledge based on a close type of peer relationship.<sup>11</sup> Therefore, using these four items to represent peer influence is close to the central idea of learning theory. The responses options are: "1=none of them," "2=few of them," "3=most of them," and "4=all of them." An exploratory principal axis factor analysis identified a one-factor solution (eigenvalue=2.95), with each item loaded significantly on the factor (range 0.775 to 0.853). Consequently, the summation of these four items was used as a variable in the final model ( $\alpha=0.88$ ).

All of the actual questions used in this study, with response categories, are shown in Appendix A. Descriptive statistics of all variables, including the demographic variables, social bonding variables and delinquent peers, can be found in Table 1 and 2 in Appendix B. In addition, the factor loading of each indicator and its respective latent variable is shown in Table 1.

**Table 1. Explanatory Principal Axis Factor Analysis**

<b>Factors</b>	<b>Factor loadings*</b>
<b>Family bond</b>	
Parents check homework	0.496
Parents help on homework	0.596
Parents are proud of you	0.810
Parents praise you	0.845
<b>Sum of squared loadings</b>	<b>1.97</b>
<b>School bond</b>	
Like school	0.633
Meaningful of school	0.658
Importance of course	0.643
Interesting of courses	0.758
Teacher praise	0.484
<b>Sum of squared loadings</b>	<b>2.06</b>
<b>Involvement</b>	
# of school based activities	0.673
# of community activities	0.788
# of faith-based activities	0.454
# of other activities	0.459
<b>Sum of squared loadings</b>	<b>1.49</b>
<b>Delinquent peer</b>	
Students smoke cigarette	0.775
Students use marijuana/hashish	0.796
Students drink alcohol	0.853
Students get drunk	0.801
<b>Sum of squared loadings</b>	<b>2.60</b>

\* All loading is after Varimax rotation.



**Table 2. Model Fit for Demographic Subgroups**

Model	Chi-square	df	p	CFI	TLI	RMSEA
Overall	162.85	21	<0.001	0.990	0.990	0.022
Age	278.22	66	<0.001	0.980	0.980	0.026
Race	239.88	42	<0.001	0.987	0.987	0.025
Gender	206.29	44	<0.001	0.990	0.990	0.022
Gender/race	249.35	82	<0.001	0.989	0.989	0.024

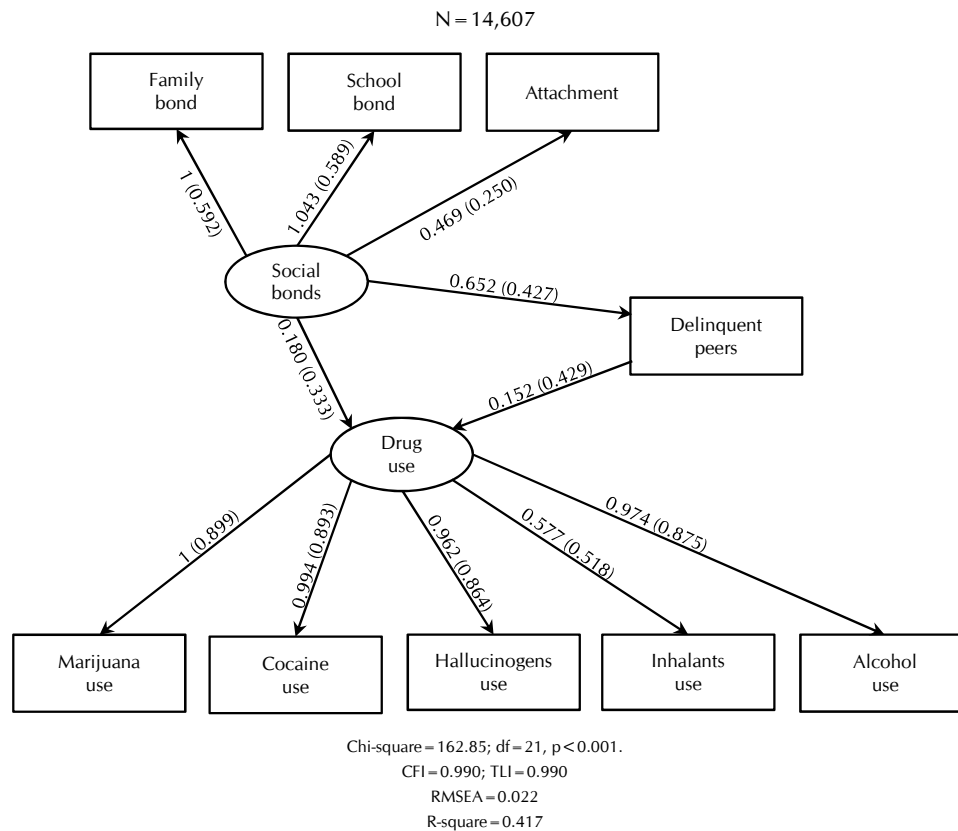
### Analytic Strategy

The analysis examined the fit of the model,<sup>12</sup> shown in Figure 1, for all samples, and across three demographic (age, gender, and race) and four gender/race subgroups by using M-plus 4.1 (Muthen and Muthen 2006), which estimates the model through MLSEM<sup>13</sup> estimation. The present study uses a multiple group analysis approach, where the factor loadings, intercepts, and means/thresholds are held equal across the groups; however, the intercepts for the relationship between latent variables and delinquent peers are not held equal (Muthen and Muthen 2006: 331-333). In multiple group analysis the structural

parameters (regression coefficients) are free, but in the present analysis these coefficients are constrained to be equal across the subgroups. Consequently, if the model fits the data well, the process through which juveniles are involved in drug use will be the same across various demographic groups.

The overall sample size is large (14,607), and even though the sample is further divided into different subgroups (e.g., gender/race, age), each group still has over 2,000 subjects. The chi-square goodness-of-fit statistic is not a good model fit index because it is sensitive to large sample sizes. Therefore, other goodness-of-fit statistics (CFI, TLI, and RMSEA) are used to assess the model fit

**Figure 2. SEM for Overall Sample\***



for each analysis. The model fit statistics for overall and each subgroup are reported in Table 2.

## Results

### Overall

The overall model fits the data very well (CFI=0.990, TLI=0.990; RMSEA=0.022). In addition, the loading and path coefficients are all significant and in the theoretically expected directions (see Figure 2). For example, the latent social control variable is significantly related to delinquent peers ( $\beta=0.427$ ) and drug use ( $\beta=0.333$ ). In addition, the delinquent peers also have a significant effect on drug use ( $\beta=0.429$ ). Hence, a juvenile is more likely to use various drugs when he has lower social control and is aware many students in his or her grade use drugs. The model explained about 42 percent of the variance in substance use, which is moderate to high.

### Age (12–13 vs. 14–15 vs. 16–17)

The analysis through multiple-group comparison and regression coefficients are also forced to be equal across groups. The proposed model fits the data well. However, upon inspection, the modification indices indicated that relaxing the school bond intercept in the 16–17 age group would improve the fit. Consequently, the reported results incorporate this change. This final model fits the data well (see Table 2 for fit indices). Hence, one can conclude that the process that leads a juvenile to drug use is similar across different age groups. That is, students from ages 12 to 17, who have strong social control (strong family and school bonds, and are involved in more conventional

activities) and know fewer same grade students who use drugs, are less likely to be involved in drug use (see Table 3). While the same process for juvenile drug use can be generalized to all three age groups, the intercepts for each group are different. The general pattern is that drug use prevalence and proportion of peer drug use increases along with age. The explained variance of drug use for each age group is 0.278 (12–13), 0.306 (14–15) and 0.310 (16–17) respectively.

### Race (White vs. Nonwhite)

The original goodness-of-fit statistics are acceptable. However, close inspection of the modify indexes reveals that relaxing the intercept for school bond in the White group can improve the fit dramatically. Consequently, the model reported here reflects this specification. The fit indices indicate the model fits the data quite well (see Table 2). All the regression coefficients are significant and in the expected directions, and the same conclusion can be made for the results in the age group analysis (see Table 4). Although the unstandardized path coefficient of social control-drug use is higher than delinquent peers-drug use, the standardized coefficients in each racial group reveal that the effect of delinquent peers on juvenile drug use behavior is stronger than social control. However, the standardized coefficient of social control-delinquent peers is higher than the delinquent peers-drug use relationship in Whites ( $0.438 > 0.437$ ) than in Nonwhites ( $0.386 < 0.452$ ). The intercept of drug use is different wherein Whites (0.036) use more drugs than Nonwhites (0.00).<sup>14</sup> The most salient difference between these two groups is the school bond because the intercept has been

**Table 3. Path Coefficients and Loadings for Age Subgroups\***

Table 3. Path Coefficients and Loadings for Age Subgroups*											
N = 14,607											
Variables	12–13				14–15				16–17		
	Social bond		Substance use		Social bond		Substance use		Social bond		Substance use
Family bond	1	(0.594)			1	(0.522)			1	(0.474)	
School bond	1.261	(0.624)			1.261	(0.646)			1.261	(0.602)	
Involvement	0.485	(0.217)			0.485	(0.236)			0.485	(0.221)	
Marijuana			1	(0.904)			1	(0.894)			1
Cocaine			0.968	(0.875)			0.968	(0.920)			0.968
Hallucinogens			0.921	(0.832)			0.921	(0.856)			0.921
Inhalants			0.550	(0.497)			0.550	(0.544)			0.550
Alcohol			1.008	(0.911)			1.008	(0.845)			1.008
Delinquent peer	0.483	(0.306)	0.136	(0.324)	0.483	(0.329)	0.136	(0.325)	0.483	(0.521)	0.136
Substance use	0.218	(0.328)			0.218	(0.354)			0.218	(0.363)	
R <sup>2</sup>	0.278				0.306				0.310		
* All loadings and path coefficients are statistically significant (p<0.05); standardized scores are in parentheses.											

\* All loadings and path coefficients are statistically significant ( $p < 0.05$ ); standardized scores are in parentheses.

**Table 4. Path Coefficients and Loadings for Race\***

N = 14,607

Variables	Nonwhite				White			
	Social bond		Substance use		Social bond		Substance use	
Family bond	1	(0.533)			1	(0.626)		
School bond	1.050	(0.604)			1.050	(0.601)		
Involvement	0.512	(0.264)			0.512	(0.280)		
Marijuana			1	(0.846)			1	(0.941)
Cocaine			1.033	(0.873)			1.033	(0.909)
Hallucinogens			1.026	(0.868)			1.026	(0.866)
Inhalants			0.613	(0.519)			0.613	(0.523)
Alcohol			1.016	(0.860)			1.016	(0.888)
Delinquent peer	0.642	(0.386)	0.145	(0.452)	0.642	(0.438)	0.145	(0.437)
Substance use	0.160	(0.300)			0.160	(0.328)		
R <sup>2</sup>	0.399				0.423			

All loadings and path coefficients are statistically significant ( $p < 0.05$ ); standardized scores are in parentheses

relaxed. Specifically, the level of school bond for Whites (10.901) is significantly higher than Nonwhites (9.142), which indicates that White students report weaker school ties than Nonwhite students.<sup>15</sup> The explained variance is somewhat higher in the White group (0.423) than is it in the Nonwhite group (0.399).

#### Gender (Male vs. Female)

The model fit both gender groups well after relaxing equal intercept constraints on involvement for the female group (CFI=0.990, TLI=0.990, RMSEA=0.022). The model can be seen in Table 5. Again, delinquent peers ( $\beta_{\text{male}}=0.429$ ;  $\beta_{\text{female}}=0.436$ ) have stronger ef-

fects on drug use than does social control ( $\beta_{\text{male}}=0.313$ ;  $\beta_{\text{female}}=0.344$ ). The inhibiting power of social control on drug use is mainly from the negative relationship between social bond and delinquent peers ( $\beta_{\text{male}}=0.415$ ;  $\beta_{\text{female}}=0.449$ ). The differences of intercept between these two groups are generally consistent with common knowledge that indicates females have a higher social level of social control and lower level of drug use than males. Moreover, females are involved in more conventional activities than are males because females have a lower level intercept of involvement (10.446) than males (11.240). The R-square for females is 0.443 and 0.394 for males.

**Table 5. Path Coefficients and Loadings for Gender\***

N = 14,607

Variables	Nonwhite				White			
	Social bond		Substance use		Social bond		Substance use	
Family bond	1	(0.594)			1	(0.587)		
School bond	1.050	(0.627)			1.050	(0.558)		
Involvement	0.477	(0.260)			0.477	(0.252)		
Marijuana			1	(0.918)			1	(0.877)
Cocaine			1.016	(0.922)			1.016	(0.891)
Hallucinogens			0.982	(0.862)			0.982	(0.861)
Inhalants			0.583	(0.531)			0.583	(0.511)
Alcohol			1.003	(0.884)			1.003	(0.880)
Delinquent peer	0.657	(0.449)	0.151	(0.436)	0.657	(0.415)	0.151	(0.429)
Substance use	0.174	(0.344)			0.174	(0.313)		
R <sup>2</sup>	0.443				0.394			

All loadings and path coefficients are statistically significant ( $p < 0.05$ ); standardized scores are in parentheses

Up to this point, the present model fits well for specific demographic subgroups (e.g., White vs. Nonwhite). Hence, one can conclude that the process that leads juveniles to drug use is similar across age, gender, and racial subgroups. However, there also presents some differences, as the intercept has to be relaxed in some subgroups. While the tests so far confirmed that the proposed model is invariant across each different demographic group, these tests are similar to those made in previous research, which addressed one demographic variable at a time. In a further test of our model, we examined the fit of the model in four different demographic subgroups (White-male, White-female, Nonwhite-male, and Nonwhite-female), where both gender and race were taken into consideration simultaneously.

*Gender/Race (NF vs. NM vs. WF vs. WM)*

The results of the tests of the model indicated a good

fit to the data (CFI=0.961, TLI=0.965, RMSEA=0.05). Inspection of the modification indices suggested the fit of the model could be improved by relaxing the intercept levels to be estimated: (1) on school bond for both White-females (WF) and White-males (WM), and (2) the involvement levels for White-females (WF). Hence, the final model included these specifications. The model fit the data quite well (CFI=0.989, TLI=0.989, RMSEA=0.024); moreover, all the path coefficients were statistically significant and in the expected direction (see Table 6).

Although the unstandardized loadings and path coefficients are the same across each gender/race group, some variations and similarities can still be found when looking at the standardized coefficients in each group. For example, while the peer effect on drug use is the most influential factor for three subgroups (NF $\beta$ =0.475>0.410; NM $\beta$ =0.440>0.378; WM $\beta$ =0.438>0.427), the social

**Table 6. Path Coefficients and Loadings for Race/Gender\***

N = 14,607

Variables	Nonwhite female				White female			
	Social bond		Substance use		Social bond		Substance use	
Family bond	1	(0.530)			1	(0.640)		
School bond	1.042	(0.617)			1.042	(0.644)		
Involvement	0.504	(0.261)			0.504	(0.289)		
Marijuana			1	(0.871)			1	(0.936)
Cocaine			1.037	(0.857)			1.037	(0.920)
Hallucinogens			1.085	(0.837)			1.085	(0.878)
Inhalants			0.634	(0.510)			0.634	(0.541)
Alcohol			1.032	(0.843)			1.032	(0.891)
Delinquent peer	0.643	(0.410)	0.139	(0.475)	0.643	(0.461)	0.139	(0.441)
Substance use	0.148	(0.323)			0.148	(0.338)		
R <sup>2</sup>	0.456				0.446			
Variables	Nonwhite male				White male			
	Social bond		Substance use		Social bond		Substance use	
Family bond	1	(0.544)			1	(0.619)		
School bond	1.042	(0.589)			1.042	(0.561)		
Involvement	0.504	(0.264)			0.504	(0.272)		
Marijuana			1	(0.830)			1	(0.895)
Cocaine			1.037	(0.860)			1.037	(0.902)
Hallucinogens			1.085	(0.900)			1.085	(0.855)
Inhalants			0.634	(0.526)			0.634	(0.512)
Alcohol			1.032	(0.856)			1.032	(0.891)
Delinquent peer	0.643	(0.378)	0.139	(0.440)	0.643	(0.427)	0.139	(0.438)
Substance use	0.148	(0.276)			0.148	(0.311)		
R <sup>2</sup>	0.361				0.405			

All loadings and path coefficients are statistically significant ( $p < 0.05$ ); standardized scores are in parentheses

bond-delinquent peers association is the most important path for the WF groups ( $\beta=0.461>0.441$ ). The relaxed intercept reveals that WF (10.283) are involved in more conventional activities than any other groups (11.334) and WF (10.575) have stronger school ties than WM (10.948); however, both groups have a weaker school bond than NF and NM (9.188). The R-square for each group is 0.361 (NM), 0.456 (NF), 0.405 (WM) and 0.446 (WF) respectively.

## **Discussion and Conclusion**

This study examined an integrated model of adolescent drug use drawn from two criminological theories on deviant behavior. While this model is not unique, previous studies have not investigated this model across gender/race subgroups (Matsueda 1982; Marcos et al. 1986). Using data from the National Household Survey on Drug Abuse, and employing a structural equation model (SEM) and multiple group analysis, this study has been able to produce some important insights into juvenile substance use.

The proposed model fits all groups well, which indicates that the model is useful for explaining drug use (marijuana, cocaine, hallucinogens, inhalants, and alcohol) regardless of one's gender, race, and age. Juveniles (12-17) who have strong social control (strong family and school bond and are involved in various conventional activities) are less likely to use drugs and know same grade students who use drugs. This general finding is consistent with previous studies (Agnew 1993; Brook et al. 1990; Erickson et al. 2000; Ginsberg and Greenley 1978; Marcos et al. 1986; Matsueda 1982; Matsueda and Heimer 1987; Preston 2006). This conclusion is firm and may be generalized to juveniles who are 12-17 in the U.S. One limitation needs to be addressed, however. Although the sample is representative, the nature of this data set is cross-sectional, which prevents any causal conclusions from being made. Massey and Krohn (1986) used longitudinal data to test their integrated model, which is similar to the present model, on juvenile smoking and found similar causal sequences among variables that are specified in the present study. However, Thornberry (1987) and Agnew (2005:82) argued that scholars should pay attention to the non-recursive relationship between variables. Hence, longitudinal data that measure various concepts from different theories, and examine for reciprocal effects are needed.

Another interesting general result is the variation across different demographic groups. The relative contribution (loadings) and intercepts for each element on the

latent variable of social control provides insights into the cross group differences. For example, the intercept of involvement for females needed to be relaxed to improve the fit when comparing males and females. However, the gender differences in the present study are actually a result of a high level of White-female student involvement because in the final model, the intercept of White-females was relaxed. This finding highlights the importance of considering the interaction between gender and race. If one only considers gender or race separately, the results will mask some the true differences. Another example is that the intercept of school is significantly different between Whites and Nonwhites. A close inspection of the final model reveals the differences not only between Whites and Nonwhites but also between White-males and White-females. Besides the relaxed intercept, the standardized path coefficients also indicate some variations. For example, in the final model (gender/race), the most important path through which white-females constrain their drug use behavior is the negative social control-delinquent peers relationship.

The above results suggest the importance of considering gender/race interaction in studying juvenile drug use. This echoes Watt and Rogers (2007) who also found different influences of peers, for instance, on alcohol use across gender/race subgroups. Although their study focused on contextual effects (e.g., SES), their results, combined with the present study and that of Cernkovich and Giordano (1992), highlight the importance of considering variation across gender and race/ethnicity subgroups. As Watt and Rogers (2007: 70) assert, one cannot simply "control" race/ethnicity in the model and expect to apply the same model to different groups. By extension, simply controlling for other important demographic variables (e.g., age, gender) may mask any underlying differences.

Many previous studies examining social control neglect involvement, due to the conceptual overlap with commitment, which may underestimate the constraining power of social control. In the present study, while involvement is less important than family and school, it nevertheless contributes to the social control. According to Hirschi (1969), students who are involved in various conventional activities simply have no time to be involved in delinquency. By extending Hirschi's idea, involvement can be seen as one's social capital, which can help a student expand his or her relationship with a broad social environment or enhance the juvenile's abilities (White and Gager 2007). As studies have shown, youth involvement in school activities increases their social capital, helping them achieve certain goals or increase their educational aspiration and attainment (Dika and Singh 2002).



Notwithstanding the benefits of involvement, Foshee and Hollinger (1996) found that higher conventional activity involvement caused higher delinquency. They argued that involvement provided a social milieu wherein juveniles spend more time with their peers, which, in turn, produced more opportunities for becoming involved in delinquency. Hence, whether involvement is beneficial to juveniles or detrimental is not so clear at this time; future research should attempt to clarify the role that involvement plays in teenage life.

The purpose of the present study is to use an integrated model, which combines social control and learning theory, to investigate juvenile drug use behavior. While this model is useful, one important concept is left out—strain/stress. As many studies have suggested, teenage years are relatively stressful when compared to childhood and adulthood (Agnew 2003; Hoffmann and Su 1998), and stressful life events/strain have lead to drug use (Asetine and Gore 2000; Hoffmann and Cerbone 1999). Consequently, in order to understand juvenile drug use behavior fully, we not only need to consider family, school, and peers, but also the strain juveniles face during their developmental stage. To complicate the matters further, as the present study has pointed out; various demographic variables need to be taken into account simultaneously. As Katz (2000) had suggested, strain theory is important in studying the crime and deviance of women, especially minority females (Preston 2006).

The present study confirmed that social control and delinquent peers affect juvenile drug use and these effects are similar across various demographic groups. However, there remains some “hidden valley” that this study does not take into account – strain/stress. Future studies need to consider these important variables when studying juvenile drug use. Moreover, when testing these integrated models, the relative importance of different theoretical variables on different demographic subgroups needs to be tested as well.

## Endnotes

1. Although studies using “mainstream” criminological theories have found support for the process that leads males to delinquency also applies to females, feminists argue that female specific theories are needed. Consequently, these feminist scholars have provided various perspectives or theories to explain female crime through a “women’s view” (Adler 1975; Chesney-Lind 1989; Steffensmeier 1980). The present study does not intend to settle the argument whether mainstream theories are potent enough to explain female crime; instead,

this study is interested in whether an integrated model can explain both female and male adolescents’ drug use and gender/race variability.

2. Another study that the present author is aware of is Cernkovich and Giordano’s (1992) study which was concerned more with the effects of the school bond on youth delinquent behavior across gender/race subgroups. The limitation of this research is that this study did not study social bonds other than the school bond, and the sample size is relatively small when compared to the present study.

3. The weighting procedure in the present study not only takes into account various adjustments (e.g., non-response, poststratification) but also adjusts for the variance. Therefore, the weighted sample is believed to be representative of the U.S. population.

4. The excluded subjects are due to two reasons: (1) they did not complete the interview (e.g., refused to answer or skipped) or misplacement (e.g., adult subjects); and (2) some respondents ( $n = 92$ ) were homeschoolers and others ( $n = 1,565$ ) did not attend either public or private school.

5. Although listwise deletion excluded about 16 percent of the total juvenile sample, 59 percent of these excluded subjects were either homeschoolers or not in any type of school. A series of statistic comparison between final sample, homeschool subjects, and students who were not in school was conducted. As one would expect, those who were not in any type of school ( $n = 1,565$ ) were less likely to have good family bond ( $t = 68.1, p < 0.05$ ) and be involved in conventional activities ( $t = 11.2, p < 0.05$ ). However, these youngsters were not more likely to use drugs than their counterparts who were in the school system. Instead, they were less likely to report drug use than school kids ( $t = -6.3, p < 0.05$ ).

6. The Comparative Fit Index (CFI), which ranges from 0 to 1, indicates the improved fit of the hypothesis model (Bentler, 1990). CFI 0.9 or higher is desirable.

7. RMSEA (Root Mean Square Error of Approximation) is also another indicator of model fit, which takes degrees of freedom into account. RMSEA that is 0.05 or less indicates a good fit; a value of RMSEA that is between 0.05 and 0.08 is acceptable. However, a model that has a RMSEA value over 0.1 is unacceptable (Brown and Cudeck 1993).

8. The Tuck-Lewis coefficient was discussed by Bentler and Bonett (1980) in the context of moment structure. The typical range for TLI is between 0 and 1 although sometimes TLI value can exceed 1. TLI value that is greater than 0.95 indicates a good fit (Hu and Bentler 1999).

9. One anonymous reviewer raised 2 questions about this scale. First, while all observable variables loaded very well on one latent variable, one should not lump all drug use behavior together. Admittedly, each drug use behavior is somewhat different from one another. The present study focused more on the “drug use” behavior, not a particular drug use. So, the present study summed all individual variables together as many previous studies did when the research purpose was about drug use behavior in general (Erickson et al. 2000; Dembo et al. 1986; Maddox and Prinz 2003). Second, whether the distribution of the latent variable violated the assumption of SEM. The distribution of the latent drug use variable had a kurtosis value equal to 2.792, which is not highly skewed (Kim et al. 2003: 133).

10. This variable, although not perfect, measured two important dimensions of family bond: parental direct control (first two items) and parent-child affective interaction (last two items).

11. One anonymous reviewer pointed out that this measure of peer delinquency was weak because these four items were simply asking students to guess the proportion of other students’ substance using behavior. Admittedly, this is not a perfect measure of peer delinquency; however, the present author still keeps this variable in the final model for 2 reasons. First, the common measure of peer delinquency is asking respondents to report their “friends” involvement in delinquency. While this kind of measure has better wording than the present study (friends’ involvement vs. students in the same grade), the common measure also has suffered the same problem of the present measure- respondent’s gauge. As Gottfredson and Hirschi (1990: 157) strongly argued, this could cause an artifact of measurement because peer delinquency and one’s delinquency are both reported by the same person; therefore, the individual may ascribe his or her behavior to others or report wrongly in other ways (see Matsueda and Anderson 1998, for excellent discussion). Hence, either measure suffers the same problems. Second, the influence of peers on an individual’s behavior is evident not only because peer groups control one’s reinforcement, but also provide an environment that is

conducive to delinquency. Consequently, a student who is surrounded by other delinquent students may increase the chance of becoming delinquent. As footnote 2 has revealed, juveniles who are in the school system are actually involved in more substance use than those who are not. This result also partially validates this measurement. Accordingly, the present measure may not be perfect and as common as others have used, but it provides the similar meaning as the usual “delinquent peer variable” and also suffers the same measurement problems.

12. In the present model, only the social control variable and drug use are treated as latent continuous variables because each is measured by several observable variables. The delinquent peer variable is an observed variable. One anonymous reviewer raised a question about the second order measure of social control variable. The present study keeps the whole model simple as it is presented in here for one reason. If the social control variables are presented as second order in the final model, the proposed model will hardly fit the data. Even if it fits the data when doing multiple group comparison procedure, the analysis does not converge or is under-identified. Hence, preventing the more complex and detailed model to be examined here as the reviewer had suggested.

13. WLSMV “is a weighted least square parameter estimator which is using a diagonal weight matrix with standard errors and mean- and variance- adjusted chi-square test statistic that use a full weight matrix” (Muthen and Muthen 2006: 426).

14. For multiple group analysis, the first group is set at zero in order to estimate other groups. This is because “latent variable means generally cannot be identified for all groups” (Muthen and Muthen 2006:335).

15. This result may be counterintuitive because scholars have argued that schools might be an aversive environment for minority students (Cohen 1955). However, as Cernkovich and Giordano (1992: 269) found, Blacks actually have a higher school bond than Whites. Gibson and Ogbu (1991: 279) also found that Blacks (both parents and children) reported a greater desire for education credentials. The present measure of school bond indicates one’s attitude to school, not necessarily his or her school performance. Hence, although Nonwhites are usually having a lower academic performance, this does not mean that they will have a lower school bond.

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## **Appendix A. Questions Used in Study**

### **Family Bond**

1. During the past 12 months, how often did your parents check if you've done homework?
2. During the past 12 months, how often did your parents provide help with your homework when you need it?
3. During the past 12 months, how often did your parents let you know that they are proud of what you have done?
4. During the past 12 months, how often did your parents let you know that you have done a good job?  
1 = Always  
2 = Sometimes  
3 = Seldom  
4 = Never

### **School Bond**

1. Which of the statements below best describes how you felt overall about going to school during the past 12 months?  
1 = You liked going to school a lot  
2 = You kind of liked going to school  
3 = You don't like going to school very much  
4 = You hated going to school
2. During the past 12 months, how often did you feel that the school work you were assigned to do was meaningful and important?  
1 = Always  
2 = Sometimes  
3 = Seldom  
4 = Never
3. How important do you think the things you have learned in school during the past 12 months are going to be to you later in life?  
1 = Very important  
2 = Somewhat important  
3 = Somewhat unimportant  
4 = Very unimportant
4. How interesting do you think most of your courses at school during the past 12 months have been?  
1 = Very interesting  
2 = Somewhat interesting  
3 = Somewhat boring  
4 = Very boring
5. During the past 12 months, how often did your teachers at school let you know when you were doing a good job with your school work?  
1 = Never  
2 = Seldom  
3 = Sometimes  
4 = Always

### **Involvement**

1. During the past 12 months, in how many different kinds of school-based activities, such as team sports, cheerleading, choir, band, student government, or club, have you participated?
2. During the past 12 months, in how many different kinds of community-based activities, such as volunteer activities, sports, clubs or groups have you participated?
3. During the past 12 months, in how many different kinds of church or faith-based activities, such as clubs, youth groups, Saturday or Sunday school, prayer groups, youth trips, service or volunteer activities have you participated?
4. During the past 12 months, in how many different kinds of other activities, such as dance lessons, piano lessons, karate lessons, or horseback riding lessons, have you participated?  
1 = 3 or more  
2 = Two  
3 = One  
4 = None

### **Delinquent Peer**

1. How many of the students in your grade at school would you say smoke cigarettes?
2. How many of the students in your grade at school would you say use marijuana or hashish?
3. How many of the students in your grade at school would you say drink alcoholic beverages?
4. How many of the students in your grade at school would you say get drunk at least once a week?  
1 = None of them  
2 = A few of them  
3 = Most of them  
4 = All of them

**Appendix B. Descriptive Statistics**

**Table 1. Description of Demographic Groups of the Youths in the Study**

N = 14,607					
	N	%		N	%
<b>Age</b>			<b>Race</b>		
12–13	4,559	31.2 %	Nonwhite	4,489	30.7 %
14–15	5,076	34.8	White	10,118	69.3
16–17	4,972	34.0			
<b>Gender</b>			<b>Race/gender</b>		
Male	7,356	50.4 %	Nonwhite male	2,233	15.3 %
Female	7,251	49.6	White male	5,123	35.1
			Nonwhite female	2,256	15.4
			White female	4,995	34.2

**Table 2. Descriptive Statistics of Social Bonding Variables and Delinquent Peers**

Variables	Minimum	Maximum	Mean	Standard deviation
Family bond	4	16	6.90	2.72
School bond	5	20	9.92	2.94
Involvement	4	16	10.81	3.11
Delinquent peer	4	16	8.49	2.50

## Self-Control and Ethical Beliefs on the Social Learning of Intellectual Property Theft\*

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**Abstract.** *Social learning theory has been identified as a strong predictor of various computer-related crimes, especially intellectual property theft (Higgins and Makin 2004; Hinduja 2006; Rogers 2001; Skinner and Fream 1997). Undoubtedly, the relationship is more complex, as other factors appear to affect one's proclivity to be influenced by the social learning components. The current study examined survey response data from over two thousand university students to clarify potential interactive effects that measures of an individual's self-control and ethical beliefs might have on the relationship between social learning and music piracy. The results indicated that self-control conditioned the effect that differential association and differential reinforcement had on levels of music piracy. In addition, ethical beliefs in piracy laws conditioned the effect that differential reinforcement and imitation had on levels of music piracy.*

**Keywords:** piracy; intellectual property theft; crime; copyright; social learning; self-control; ethics; morality

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### Introduction

The tenets of Akers' (1977) social learning theory have been identified throughout the literature as important explanations for numerous types of deviant behavior. Recent research in the realm of intellectual property (IP) theft has produced similar results as the components of learning theory have been found to significantly predict participation in software piracy (Higgins and Makin 2004; Rogers 2001; Skinner and Fream 1997) and music piracy (Hinduja 2006).

The use of social learning theory as a framework for understanding participation in IP theft is a logical one. In order to commit such acts, one must obtain the necessary techniques, which usually requires learning from others some type of computer-related skill (Skinner and Fream 1997), as well as the motives, drives, and rationalizations to induce commission. Furthermore, specific forms of IP theft, such as software piracy and music piracy, allow the offender to receive tangible rewards (e.g., free software or songs) quickly and at minimal risk, further reinforcing that behavior (Higgins and Makin 2004; Hinduja 2003; Hinduja 2006). Imitation of other participants in IP theft that one sees or meets in cyberspace can take place as the actions of more experienced users are copied by those

new to the scene through specific prescribed instruction or through emulation of methods to acquire or exchange unauthorized digital music files. Finally, definitions that characterize the activity as positive, beneficial, and commonly-accepted are very present in the textual interaction among members in online environments where music piracy occurs, and serve to strengthen or at least sustain participation.

Findings from research studies have spawned various policy implementations to change individual attitudes toward IP theft, and to deter individuals from continuing to engage in such acts. For example, the International Federation of the Phonographic Industry (IFPI) designed and implemented formal strategies involving educational components to raise individual awareness about the negative effects of music piracy (e.g., public awareness campaigns) and litigation components to forestall participation (Associated Press 2005; CNN.com 2004; IFPI 2002; IFPI 2005; Slashdot.org 2005). Although such strategies may reduce IP theft to a certain extent, critics argue that such strategies are "insufficient to gain widespread public compliance with the law" (Tyler 1996:224). While numerous possibilities exist as to why this might be the case, one potential reason is that stable traits and beliefs of individuals affect their proclivity to be influenced by

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the social learning components that guide these suggested policies.

*Self-control and beliefs regarding the law* are two factors that may play a conditioning role. Prior research has found that more stable characteristics of individuals interact with other social elements to produce differential effects on criminal behavior (Evans, Cullen, Burton, Dunaway, and Benson 1997), occupational delinquency (Gibson and Wright 2001), and software piracy (Higgins and Makin 2004). In other words, low self-control and ethical beliefs may condition the effect that social learning components have on levels of IP theft. By examining the nature of these conditional effects, efforts can be made to disentangle the complex nature of this phenomenon and inform the development of policy specifically related to these elements.

The purpose of the current work was to empirically test for potential interactive effects that individual levels of self-control and belief in piracy laws have on the relationship between social learning components and a specific type of IP theft—music piracy. Before describing the nature of the study, this article begins by providing a brief background on music piracy and its perceived consequences on the music industry. Prior research on social learning theory, self-control theory, ethical beliefs, and their relevance to the phenomenon of music piracy is then reviewed. Details related to the sample and research methodology are then provided before the data are analyzed and findings discussed.

### What is Music Piracy?

Music piracy is a form of Internet piracy that involves “the act of making available, transmitting, or copying someone else’s work over the Internet without permission” (IFPI 2005:18). In this respect, it constitutes IP theft because these actions violate copyright infringement laws (Copyright Office of the United States 2000a). The term “copyright” is defined as the legal right granted to an author, composer, playwright, publisher, or distributor to exclusive publication, production, sale, or distribution of a literary, musical, dramatic, or artistic work (de Fontenay 1999). Copyrights cover both published and unpublished works, and are secured immediately upon the expression of an original work in fixed, tangible form (Copyright Office of the United States 2000a). Each copyright grants the owner explicit and sole permission to modify, distribute, reproduce, perform, or display the work. Accordingly, uploading an unauthorized music file to a web or file server that can be accessed by others through their web browser or through a file transfer pro-

gram is a form of *distribution*. If the copyrighted work is not owned or authored by the uploader, that person is breaking the law. When an individual requests an unauthorized digital music file from a web or file server, or uses a file exchange program to download music onto his or her hard drive, an exact copy of that sound recording is made on the recipient’s computer system. This violates the *reproduction* tenet of the copyright law, as non-owners must have explicit permission to duplicate protected works, whether for profit or merely for personal listening pleasure, and regardless if it is for a transitory or permanent period of time (Copyright Office of the United States 2000a; Copyright Office of the United States 2000b; RIAA 2000a).

According to some estimates, music piracy has had a significant effect on the music industry worldwide. For example, the International Federation of the Phonographic Industry asserts that music sales had declined by over six billion dollars between 1998 and 2003 (IFPI, 2005). Most of this decline has been attributed to the illegal downloading and sharing of music files over the Internet. In 2001, an estimated 99 percent of all music files available online were unauthorized (IFPI 2005). Despite legislation and lawsuits (105th Congress 1997; A & M Records Inc. et al. v. Napster Inc. 2001; CNN.com 2000a; CNN.com 2000b; Crawford 2005; Davis 2003; Duke Law School 2005; Electronic Frontier Foundation 2005; Healy 2003; Jones 2000; Lipton 1998; Mendels 1999; Patrizio 1999; Philipkoski 1999a; Philipkoski 1999b; RIAA 2000b; Spring 2000), the prevalence of music piracy does not appear to be attenuating, as approximately nine out of ten downloaders worldwide in 2004 were still obtaining music files through illegal means (IFPI 2002; IFPI 2005). While perhaps sensationalistic, the economic impact of music piracy has led some to describe it as “the greatest threat facing the music industry worldwide today” (Chiou, Huang, and Lee 2005:161).

The scope and gravity of the impact of music piracy have spurred empirical research in recent years. The majority of this research, however, has focused primarily on identifying its prevalence (Angus Reid Worldwide 2000; Archambault 1999; Pew Internet & American Life Project 2000; Stenneken 1999; Webnoize 2000) or in identifying its relevant antecedents (Banerjee, Cronan, and Jones 1998; Bhattacharjee, Gopal, and Sanders 2003; Chiou, Huang, and Lee 2005; Gopal, Sanders, Bhattacharjee, Agrawal, and Wagner 2004). To note, few studies have developed and applied theoretical frameworks to its study (d’Astous, Colbert, and Montpetit 2005; Gopal et al. 2004; Hinduja 2006). The current work thus seeks to fill the gap in the extant literature base by examining

the relevance of multiple theoretical elements to music piracy.

## **Theoretical Framework**

### *Social Learning Theory*

Building upon Sutherland's (1947) theory of differential association, Ronald Akers (1977) developed what is known as social learning theory. The basic premise of the theory is that "the same learning process, operating in a context of social structure, interaction, and situation, produces both conforming and deviant behavior" (Akers 1998:50). Deviant behavior, however, will likely occur when the individual develops more antisocial ties that create an environment for learning that behavior, as well as providing support for (and thereby reinforcing) such behavior (Akers 1998). In order to clarify this process, Akers expounded upon four concepts central to the theory.

*Differential association* is assumed to be the primary component through which behaviors are learned, as individuals who interact with antisocial others tend to be more likely to participate in deviant behavior (Sutherland 1947; 1949a; 1949b). Whereas differential association is the primary learning component, *differential reinforcement* is the "basic mechanism...by which learning most relevant to conformity or violation of social and legal norms is produced" (Akers 1998:57-58; Skinner 1953). Concerning the latter, the frequency with which a behavior occurs is dependent upon the individual's perceived rewards and expected punishments associated with engaging in that behavior (Akers, Krohn, Lanza-Kaduce, and Radosevich 1979:638; Skinner 1957). The final two components, *imitation* and *definitions*, develop the notion that individuals model their behavior after those with whom they associate and that, as a result of being exposed to deviance, individuals develop attitudes and rationalizations that support that behavior over more conforming or socially acceptable actions (Akers 1985; Akers 1998).

In sum, proponents of social learning theory contend that in order for criminal behavior to occur, one must acquire the necessary techniques and skills needed to engage in that behavior (Akers 1998; Sutherland 1947). Once a social environment is created consisting of associations with persons inclined to criminality, patterns of imitation and the internalization of definitions can then follow, with reinforcing stimuli later playing a large role in determining perpetuation. Akers further states that the theory links individual and social processes, as structural conditions influence a person's differential associations, models of behavior, definitions conducive or aversive

to crime commission, and differential reinforcements (Akers 1992; Akers 1998). The empirical support garnered for the components of the theory and various forms of IP theft (e.g., Higgins and Wilson 2006a; Higgins and Makin 2004; Hinduja 2006; Rogers 2001; Skinner and Fream 1997) further enhances the plausibility of social learning theory as an explanation for this type of criminal behavior. While this corroborates the inclusion of social learning theory variables in empirical models, the viability of another aspect of the theory is not as clear.

Akers (1998:51) argues that by explaining the social processes through which individuals are more likely to commit deviant acts, social learning theory "is capable of accounting for the development of stable individual differences, as well as changes in the individual's behavioral patterns or tendencies to commit deviant and criminal acts, over time, and in different situations." Recent research, however, has suggested that such stable differences (e.g., self-control), when combined with social learning processes, increases the likelihood of criminal behavior (Evans et al. 1997; Gibson and Wright 2001). These findings suggest interactive effects and thereby call into question the ability of social learning theory to account for individual processes on its own – consequently warranting further investigation. Based upon the extant literature (Gopal and Sanders 1997; Gopal and Sanders 1998; Gopal et al. 2004; Higgins 2005; Higgins and Makin 2004; Higgins and Wilson 2006b; Im and Van Epps 1991; Kievit 1991; Thong and Yap 1998; Wong 1995), two stable individual differences that may bear particular importance to both social learning and music piracy are an individual's self-control and ethical beliefs regarding piracy laws.

### *Self-Control Theory*

The concept of self-control as an explanation for criminal behavior was first developed by Gottfredson and Hirschi (1990) in *A General Theory of Crime*. The primary assumption of the theory is that people are inherently motivated to engage in criminal behavior. Individual differences exist, however, in the ability to suppress these motivations. For them, the most salient individual difference is one's self-control and is composed of six elements: impulsivity, a preference for simple tasks, risk-taking, a preference for physical activity (as opposed to mental activity), self-centeredness, and temper (Gottfredson and Hirschi 1990:89). The key proposition, then, is that those who possess these psychological traits and have the opportunity to engage in criminal behavior are more likely to partake in crime (Gottfredson and Hirschi 1990;

Grasmick, Tittle, Bursik, and Arneklev 1993). An individual's propensity to exhibit these traits is attributed to ineffective parenting during childhood (Gottfredson and Hirschi 1990).

Self-control theory has received considerable attention throughout the literature and both its measures (e.g., Grasmick, Tittle, Bursik, and Arneklev 1993) and its empirical validity (Pratt and Cullen 2000) have been well-supported. The latter is important because Gottfredson and Hirschi (1990:91) contend that the theory is a versatile one that explains a wide range of deviant behaviors (therefore appropriately termed "a general theory of crime"). Few studies have examined the extent to which self-control predicts IP theft (Higgins and Makin 2004; Higgins and Wilson 2006b; Hinduja 2006), but the results do lend additional support to the versatility of the theory. These results indicate that individuals low in self-control are more likely to engage in IP theft, further illustrating the importance of including measures of self-control into empirical models involving digital piracy.

Contrary to Gottfredson and Hirschi's (1990:232) claim that low self-control is "*the individual cause of crime*" (italics in original) which "tells us that the search for...correlates of crime other than self-control is unlikely to bear fruit," empirical evidence continues to mount indicating the importance of other theoretical variables. For example, prior research examining both low self-control and social process variables—such as association with deviant peers—have found that the latter continually exhibit independent effects on criminal behavior after controlling for the effects of the former (Evans et al. 1997; Gibson and Wright 2001; Matsueda and Anderson 1998; Pratt and Cullen 2000; Wright, Caspi, Moffitt, and Silva 1999). Specific to the subject matter of the current work, a recent study of 318 undergraduate students revealed that low self-control significantly influenced *software* piracy participation, and that rudimentary social learning theory variables also had some predictive effect (Higgins 2005; Higgins and Makin 2004). Although the plausibility of incorporating other trait-based factors in addition to self-control is unclear, an important individual difference found to consistently predict intentions to engage in IP theft is one's ethical beliefs regarding piracy laws.

#### *Ethical Beliefs in Piracy Laws*

A consistent finding in the literature on IP theft is that one's ethical predispositions to IP theft laws influences the likelihood that one will engage in pirating behavior. Specifically, those who believe that IP theft is morally or ethically appropriate are more likely to engage in the act

(Chiou, Huang, and Lee 2005; Gopal and Sanders 1997; Gopal and Sanders 1998; Gopal et al. 2004; Higgins and Makin 2004; Im and Van Epps 1991; Kievit 1991; Thong and Yap 1998; Tyler 1996; Wong 1995)<sup>1</sup>. Although these empirical studies were aimed primarily at identifying antecedents to IP theft, theoretical underpinnings are present from elements of social control theory (Hirschi 1969), neutralization theory (Sykes and Matza 1957; Sykes and Matza 1999), and social learning theory (Akers 1985; Akers 1998). For example, Hirschi (1969:203) argues that moral belief in the law is related to deviant behavior in the sense that people with few attachments to conventional society will not see the necessity in obeying the laws or norms of that society. Conversely, Sykes & Matza (1999:85) argue that holding beliefs favorable to law violation are based upon an individual's own rationalizations (e.g., the general acceptance of the five neutralization techniques) and are used to decide whether to follow society's norms. Finally, Akers (1985; 1998) has stated that attitudes—which are directly tied to one's belief system—are a key contributing factor in how behavior is learned from others. Although these approaches differ in the specific processes by which law-abiding beliefs promote deviance, they agree on the notion that such beliefs demonstrate independent effects.

Although proponents of self-control theory likely question the notion that ethical beliefs in the law independently affect behavior, and would argue that any such effects are spurious due to one's low self-control, the current authors follow the assumptions of prior research indicating that additional factors do exert independent effects (Evans et al. 1997; Gibson and Wright 2001; Matsueda and Anderson 1998; Pratt and Cullen 2000; Wright, Caspi, Moffitt, and Silva 1999) and explore the possibility that ethical predispositions are not necessarily influenced by the same processes as personality traits.

To summarize, extant literature suggests that the components of Akers' (1977) social learning theory both apply to and predict intentions to engaging in IP theft (e.g., Higgins and Makin 2004; Hinduja 2006; Rogers 2001; Skinner and Fream 1997). Additional findings, however, also indicate that the relationship between these components and IP theft may be conditioned by individual differences such as low self-control (Evans et al. 1997; Gibson and Wright 2001) or ethical predispositions to the law (Higgins and Makin 2004). Indeed, Higgins and Wilson (2006) recently found that low self-control, differential association, and favorable attitudes were positively related to software piracy, while moral beliefs were inversely related. Generally, they also found that moral beliefs can condition the link between the theories

and piracy (although significant differences among the groups were not found). The current study builds upon the foundation laid by Higgins and Wilson by studying a more popular phenomenon (music piracy) and by assessing the extent to which both self-control and ethical beliefs moderate the relationship between social learning components and music piracy (Higgins and Makin 2004; Higgins and Wilson 2006b; Hinduja 2006; Rogers 2001; Skinner and Fream 1997).

## **Hypotheses**

The current authors accordingly expect the conditional relationships previously found in software piracy research to be salient when considering music piracy. As such, the following hypotheses are given:

1. The relationship between the four components of social learning theory on levels of music piracy varies as a function of one's self-control.
2. The relationship between the four components of social learning theory on levels of music piracy varies as a function of one's ethical beliefs in music piracy laws.

In addition, it is expected that the individual effects of the social learning components, low self-control, ethical beliefs in the law, as well as relevant demographic characteristics, will be significantly related to levels of music piracy.

## **Method**

### *Data*

A survey instrument designed to determine how these theoretical tenets apply to music pirating behavior was administered in the fall of 2003 to a sample of undergraduate students at a large public university in the Midwest region of the United States. University populations have been used commonly in the criminology and criminal justice disciplines when attempting to test the empirical validity of certain criminological theories (Mazerolle and Piquero 1998; Nagin and Paternoster 1993). Furthermore, studies on the subject of cheating, plagiarism, and software piracy have employed similar methodological strategies (Agnew and Peters 1986; Buckley, Wiese, and Harvey 1998; Eining and Christensen 1991; Im and Van Epps 1991; Wong, Kong, and Ngai 1990). Finally, there is significant evidence

demonstrating that the university environment is rife with participation in digital song-swapping, fostered primarily because of the high-speed, dedicated Internet connections installed in residence halls (Davis 2003; Healy 2003; Hinduja 2006; Latonero 2000).

The survey contained a number of questions pertaining to both past and present downloading behavior in order to provide a comprehensive account of student involvement in music piracy. In addition, multiple measures of each of the four components of social learning theory as well as measures pertaining to an individual's self-control (measured attitudinally<sup>2</sup>) and moral beliefs regarding music piracy laws were also included. Finally, questions relating to respondents' demographic characteristics, type of Internet connection, and abilities to perform various actions online were included as controls in the study.

So as not to bias the responses, students were initially informed of the *general* purpose of the study, and after completion of the survey were debriefed as to its *exact* purpose. The voluntary and anonymous nature of the research was also emphasized in order to increase the likelihood of accurate and candid feedback from participants. To note, a pre-test was conducted on fifty-two undergraduate criminal justice students to assess the validity and reliability of the measures. The results indicated significant variation in music piracy participation to allow for statistical analysis.

### *Sample*

In order to obtain a sample that would be generally representative of music pirating behavior in the undergraduate population as a whole, a purposive sampling procedure for heterogeneity was employed. This approach entails selecting a criterion that would likely produce variation in the outcome of interest, and then sampling based upon that criterion (Singleton and Straits 1999). For a sample of college students, area of study was the criterion believed to produce substantial variation in music piracy behaviors; thus, a three-stage approach was used to sample across college majors.

First, a list including the fifteen colleges of the university as well as the department and schools within these colleges was obtained. Then, three majors within each college were randomly selected so that specific classes within them could be identified. Finally, between one and two lower-level classes and between one and two upper-level classes were randomly selected from the chosen majors and the university's course catalogue. This sampling procedure produced a list of 185 potential classes eligible for survey administration. Correspondence was



then sent to the professors of these classes describing the nature of the study and requesting twenty minutes of class time to administer the survey. Professors representing 16 classes—relatively well-distributed across majors—gave permission for the researcher to administer the surveys. Despite the fact that permission was given in only 16 of 185 classes, a broad range of student majors were expected to be represented in those 16 courses due to their interdisciplinary content and because some were required for all undergraduates to take. Following listwise deletion of cases with missing data, 2,032 valid responses were obtained, and comprise the sample used in the following analyses.

To note, the study was restricted to undergraduate students because they are more representative of traditional conceptions of the “college population,” and because one might argue that they are categorically different in many ways than those in graduate school. Nonetheless, the demographic question related to the respondent’s year of study did include a “graduate school” answer choice in case a graduate student was enrolled in a higher-level undergraduate class to earn elective credits. Those who identified themselves as graduate students were removed from the analysis.

Table 1 displays descriptive statistics for the study sample. The majority of respondents were female (56.7%), White (77.9%), and nineteen years of age or younger (57.6%). With regard to educational level, most respondents were freshmen (31.4%), followed by sophomores (28.9%), juniors (24.2%), and seniors (15.5%). Furthermore, almost a quarter of respondents were Social Science majors, and with the exception of Human Ecology and Engineering majors, students from the other five study areas each composed between 10–18 percent of the sample respectively. Finally, an overwhelming majority of the sample (88.9%) had high-speed Internet connections and most had engaged in a variety of Internet-related activities (e.g., shopped online, played games online, created a web page, participated in an online auction).

## Measures

### *Dependent Variable*

The primary outcome of interest in the study is the individual’s level of participation in music piracy via illegal/unauthorized MP3 files. MP3 files are one of the most popular types of digital music, with hundreds of millions available online at any time (Black 2003; Sharman Networks 2005). They are also the most susceptible to piracy because they are largely without built-in copy pro-

tection mechanisms. That is, they can be created, distributed, duplicated, and burned to data or audio CD with no limitations. To note, these files should not be mistaken for (or confused with) the legal digital music files that are currently available online through legitimate outlets (such as Napster-to-Go, Apple’s iTunes, RealNetworks’ Rhapsody, Yahoo! Music, MSN Music, eMusic, and Pressplay).

Accordingly, thirteen questions regarding respondents’ involvement in music piracy across various time frames were measured and combined into a single score using factor analysis with promax rotation (Eigenvalue=7.201, factor loadings > .59). Specific items composing the score were drawn from prior studies on MP3s conducted by various research firms (Angus Reid Worldwide 2000; Jay 2000; King 2000a; King 2000b; Latonero 2000; Learmonth 2000; Pew Internet & American Life Project 2000; Reciprocal Inc. 2000a; Reciprocal Inc. 2000b; Stenneken 1999; Webnoize 2000) and are included in Appendix A.

Responses—although dependent upon the exact question—were all ordinal in nature with the five categories representing incrementally more involvement in that particular behavior. The resulting measure, hereafter referred to as *Level of Music Piracy*, is indicative of the respondents’ overall immersion in illegal/unauthorized MP3 downloading behavior. The use of such an approach in the current work has been supported by research examining other types of intellectual property theft (Rahim, Seyal, and Rahman 1999; Sims, Cheng, and Teegen 1996; Solomon and O’Brien 1990; Wood and Glass 1995). It should be noted that a constant of 1.69 was added to each subject’s factor score to eliminate negative values for music piracy ( $\bar{x}=1.69$ ,  $s.d.=1.00$ ). This will allow for a more meaningful understanding of the phenomenon in the subsequent analyses and graphical presentations.

### *Independent Variables*

**Social Learning Variables.** Fifteen individual questions in the survey were used to measure the four components of social learning theory: differential association, differential reinforcement, definitions, and imitation. Respondents were asked to consider their participation with illegal/unauthorized MP3s and state their level of agreement with each question. Potential responses included: “Strongly Disagree,” “Disagree,” “I do not participate with MP3s,” “Agree,” and “Strongly Disagree.” Specific items for each learning component are included in Appendix A.

*Differential association* is a factor score composed of

four items reflecting respondent exposure to MP3 downloading via their real life acquaintances (Eigenvalue=2.42, factor loadings > .70). *Differential reinforcement* is a factor score composed of four items measuring the respondent's perceived rewards experienced from downloading music (Eigenvalue=2.84, factor loadings > .80). *Definitions* is a factor score composed of four items measuring the relevance of appropriate reasons and rationalizations in inducing pirating behavior (Eigenvalue=1.99, factor loadings > .66). Finally, *imitation* is a factor score composed of three items reflecting respondents' exposure to MP3 downloading via offline/online media sources and online acquaintances (Eigenvalue=1.69, factor loadings > .58). All items comprising each of the four factors were coded so that higher values indicated more offline or online exposure to music piracy, more definitions favorable to music piracy, and greater perceived rewards experienced from engaging in such behavior.

**Low Self-Control.** The survey instrument included six questions designed to measure an individual's self-control. Each of the six questions were taken from the Grasmick et al. (1993) scale designed to reflect each of the six elements characteristic of individuals with low self-control. Potential responses to each of the questions were based on a five-point Likert scale ranging from "strongly disagree" to "strongly agree," and items were coded so that higher values indicated lower levels of self-control. Principal components factor analysis, however, revealed that the measure was not unidimensional; only three of the six items loaded on a single factor. Items reflecting preference for simple tasks and preference for physical activity as well as self-centeredness were found to load on a single dimension. Thus, a factor score for these three items was created and used as the *low self-control* measure (Eigenvalue=1.09, factor loadings > .58).

**Ethical Belief in Music Piracy Laws.** Four survey items were used to assess beliefs concerning music piracy laws. For each question, respondents were asked to consider circumstances involving their perceptions about the legality of MP3 downloading and whether these perceptions influence their downloading behavior. Potential responses were based on a five-point Likert scale ranging from whether they "strongly disagreed" to "strongly agreed" with each statement. Items were coded so that higher values reflected beliefs more favorable to downloading, and an *ethical beliefs* factor score was computed (Eigenvalue=2.24, factor loadings > .71).

**Control Variables.** Five variables were included in the study to serve as controls. Three demographic characteristics of the respondent, *gender* (male=1), *race*

(White=1), and *age* (20+=1), were included to account for potential demographic differences in downloading behavior. *Internet connection* was a dummy variable (high-speed=1; dialup/no connection=0) reflecting respondent connection speed for their Internet service. Finally, *Internet proficiency*<sup>3</sup> was measured as an interval-level variable indicating the number of online activities in which the respondent had participated, ranging from zero (coded as 1) to nine or more (coded as 5). Prior research has suggested that software pirates tend to be more male than female, younger than older, more comfortable and experienced with computers than novices, and more likely to own a personal computer than not (Hinduja 2001; Hinduja 2003; Rahim, Seyal, and Rahman 1999; Sims, Cheng, and Teegen 1996; Solomon and O'Brien 1990; Wood and Glass 1995). Other research has found both connection speed and computer usage are correlates of software piracy (Higgins and Makin 2004; Hinduja 2001; Hinduja 2003). As such, these variables are expected to be similarly related to music piracy.

**Interaction Terms.** Since the aim of the present study is to assess the extent to which low self-control and moral beliefs condition the effect that social learning components have on levels of music piracy, a brief description of the interaction terms is warranted. Following procedures outlined by Aiken and West (1991), product terms were computed for each of the four social learning components and each moderating variable (eight product terms in all). As all six of the variables used to create the product terms were factor scores with means equal to zero, mean centering of the component variables was not necessary.<sup>4</sup>

## Results

The current research endeavor purposes to empirically examine the extent to which the effects of social learning components on music piracy vary as a function of more stable traits such as low self-control and attitudes toward piracy laws. First provided is a general overview of downloading behavior for the sample. Next, bivariate correlations are presented to assess the nature of the relationships among the variables. Finally, OLS regression techniques are used to determine the existence of any interactions among the theoretical variables.

### *Participation in Music Piracy*

Table 1 reports the study sample's participation in music piracy by showing responses to the question, "How many total MP3s have you downloaded over the course



**Table 1. Sample Characteristics and Participation in Pirating**

N = 2,032

Variable		Sample %	Total MP3s ever downloaded				
			0	1-100	101-500	501-2000	2001 +
Sex							
	Male	43.3 %	7.2 %	9.0 %	22.6 %	38.5 %	22.8 %
	Female	56.7	16.1	14.6	30.2	31.3	7.8
Race							
	White	77.9 %	10.7 %	11.1 %	27.2 %	36.3 %	14.7 %
	African American	10.1	24.8	15.5	24.8	22.8	12.1
	Asian	5.6	10.5	19.3	33.3	27.2	9.6
	Other	6.4	13.2	14.0	20.9	35.7	16.3
Age							
	19<	57.6 %	10.4 %	14.3 %	30.0 %	33.8 %	11.5 %
	20>	42.5	14.7	9.3	22.7	35.2	18.1
Internet Connection							
	High speed	88.9 %	10.0 %	11.5 %	27.6 %	36.0 %	15.1 %
	Dialup	8.3	27.4	22.0	20.2	20.8	9.5
	None	2.8	40.4	5.3	26.3	24.6	3.5
Internet Proficiency							
	No activities	2.9 %	42.4 %	11.7 %	13.5 %	25.4 %	7.0 %
	1-2 activities	14.4	22.5	16.7	32.4	21.2	7.2
	3-5 activities	38.9	14.0	14.7	29.8	32.4	9.1
	6-8 activities	31.9	6.2	9.1	26.4	43.1	15.3
	9+ activities	11.9	2.9	6.6	15.4	36.1	39.0
Major							
	Social science	24.8 %	15.3 %	12.5 %	25.0 %	34.0 %	13.1 %
	Business	12.0	10.2	12.7	27.5	34.0	15.6
	Natural science	11.7	13.1	11.0	27.8	33.3	14.8
	Comm. arts/sciences	10.6	6.5	10.6	20.4	10.7	21.8
	Engineering	6.9	7.1	7.9	27.1	37.1	20.7
	Human ecology	5.7	16.5	11.3	35.7	30.4	6.1
	Undecided	10.1	9.7	14.6	30.1	35.4	10.2
	Other	18.2	14.3	13.5	27.8	31.8	12.7
Base % of sample		100.0 %	12.3 %	12.2 %	26.9 %	34.4 %	14.3 %

of your life thus far?" Almost half of the study sample (48.7%) reported having downloaded at least 500 songs over the course of their lifetime. Furthermore, the majority of these songs were not obtained from personally-owned music CDs as only 30 percent listed that all or a small amount (30% or less) of their MP3s came from such sources.

Looking at piracy across sample demographics, males, older students, and Whites tended to be more frequently involved in illegal downloading behavior. In accordance with intuition, those with faster Internet connections as well as those most versed in Internet activities were also heavily involved as 15.1 percent and 39 percent respectively reported having unlawfully downloaded over two thousand songs. Finally, those majoring in Engineering

and Communication Arts and Sciences had downloaded more MP3 files. Overall, these results suggest that the study sample was quite active in pirating music files over the Internet.

#### *Bivariate Analysis*

Correlations among all of the variables included in the analysis (see Appendix B) revealed that all of the theoretical variables were significantly associated with music piracy, and that these associations were in the expected direction. An examination of the correlations along with tolerance levels for two initial regression models (not reported) indicated that multicollinearity existed among the social learning theory measures. This

**Table 2. Differential Association Predicting Music Piracy**

N = 2,032

Variable	Model 1			Model 2		
	b	S.E.	B	b	S.E.	B
Diff. association	.29 ***	.02	.29	.22 ***	.02	.22
Low self-control	.06 **	.02	.06	—	—	—
DA X LSC	-.06 **	.02	-.06	—	—	—
Ethical beliefs	—	—	—	.16 ***	.02	.16
DA X EB	—	—	—	-.004	.02	-.004
Male	.44 ***	.04	.22	.44 ***	.04	.22
Age (20+)	.08 *	.04	.04	.09 *	.04	.04
White	-.08	.05	-.03	-.10 *	.05	-.04
Internet connection	.29 ***	.06	.09	.29 ***	.06	.09
Internet proficiency	.24 ***	.02	.23	.25 ***	.02	.24
Constant	.45 ***	.09		.46 ***	.09	
R <sup>2</sup>		.26 ***			.28 ***	

\*\*\*p &lt; .001

\*\*p &lt; .01

\*p &lt; .05

was particularly apparent for the measures of differential association, differential reinforcement, and their respective interaction terms as their correlations were all near or above .70 and the variance inflation factors for these variables in the initial regression models were all greater than two. This is not too alarming, however, as Akers himself specifically stated that the elements are not conceptually distinct and that interrelationships do exist (Akers 1977; Akers, Krohn, Lanza-Kaduce, and Radosevich 1979). Due to the presence of multicollinearity, eight separate OLS regression models were run (e.g., one model for each learning component with each moderating variable) to test for interactive effects.

#### Multivariate Analysis

Tables 2 through 5 show the results of the OLS regression models. To answer the primary research question of whether an individual's self-control and/or beliefs toward piracy laws condition the effect that social learning has on levels of music piracy, it should be noted that four of the interaction terms in the models are statistically significant. Specifically, the results indicate that the effect of differential association on levels of music piracy varies as a function of one's self-control (Model 1; B = .06), the effect of differential reinforcement on levels of music piracy varies as a function of one's self-control (Model 3; B = .07) and beliefs regarding piracy laws (Model 4;

**Table 3. Differential Reinforcement Predicting Music Piracy**

N = 2,032

Variable	Model 3			Model 4		
	b	S.E.	B	b	S.E.	B
Diff. reinforcement	.40 ***	.09	.40	.36 ***	.02	.36
Low self-control	.07 ***	.02	.07	—	—	—
DR X LSC	-.07 ***	.02	-.08	—	—	—
Ethical beliefs	—	—	—	.12 ***	.02	.12
DR X EB	—	—	—	.05 **	.01	.06
Male	.42 ***	.04	.21	.41 ***	.04	.20
Age (20+)	.10 **	.04	.05	.11 **	.04	.05
White	-.05	.04	-.02	-.07	.04	-.03
Internet connection	.18 **	.06	.06	.20 **	.06	.06
Internet proficiency	.21 ***	.02	.21	.22 ***	.02	.21
Constant	.62 ***	.09		.60 ***	.09	
R <sup>2</sup>		.33 ***			.33 ***	

\*\*\*p &lt; .001

\*\*p &lt; .01

\*p &lt; .05

**Table 4. Imitation Predicting Music Piracy**

N=2,032

Variable	Model 5			Model 6		
	b	S.E.	B	b	S.E.	B
Imitation	.09 ***	.02	.09	.04 *	.02	.04
Low self-control	.04	.02	.04	—	—	—
I X LSC	-.01	.02	-.01	—	—	—
Ethical beliefs	—	—	—	.23 ***	.02	.23
I X EB	—	—	—	.04 *	.02	.04
Male	.44 ***	.04	.22	.43 ***	.04	.21
Age (20+)	.03	.04	.02	.06	.04	.03
White	.02	.05	.01	-.03	.05	-.01
Internet connection	.42 ***	.07	.13	.36 ***	.06	.11
Internet proficiency	.27 ***	.02	.26	.26 ***	.02	.25
Constant	.19 *	.09		.30 **	.09	
R <sup>2</sup>		.19 ***			.24 ***	
	***p<.001	**p<.01	*p<.05			

B=.05), and the effect of imitation or modeling on levels of music piracy varies as a function of one's beliefs regarding piracy laws (Model 6; B=.04).<sup>5</sup>

In order to assess the nature of these interactions, the approach of Aiken and West (1991) was followed and MODGRAPH (Jose 2002) was used to plot the simple regression slopes at three different values for each moderating variable (See Figure 1). In the graphs, the middle or “medium” line represents the simple regression slope when the moderating variable is held at its mean; the line labeled “high” is the simple regression slope when the moderating variable is set at one standard deviation above the mean of the moderating variable; and the line labeled “low” constitutes the simple regression slope when the

moderating variable is set at one standard deviation below the mean of the moderating variable. The nature of the interaction is determined by the divergence—or “fan effect”—of the slope lines.

Based upon Figure 1a, self-control has the greatest impact under low levels of differential association. In other words, individuals with few friends and acquaintances in real life who download music report differential levels of music piracy depending upon their levels of self-control. Those with low self-control report higher levels of music piracy than those with greater self-control. Conversely, self-control makes no difference when individuals have more real-life friends and acquaintances that download music. Thus, greater self-control seems to

**Table 5. Definitions Predicting Music Piracy**

N=2,032

Variable	Model 7			Model 8		
	b	S.E.	B	b	S.E.	B
Definitions	.13 ***	.02	.13	.05 *	.02	.05
Low self-control	.03	.02	.03	—	—	—
D X LSC	.03	.02	.03	—	—	—
Ethical beliefs	—	—	—	.22 ***	.02	.22
D X EB	—	—	—	.03	.02	.03
Male	.45 ***	.04	.22	.43 ***	.04	.21
Age (20+)	.03	.04	.01	.06	.04	.03
White	-.02	.05	-.01	-.05	.05	-.02
Internet connection	.41 ***	.07	.13	.35 ***	.06	.11
Internet proficiency	.27 ***	.02	.26	.27 ***	.02	.26
Constant	.21 *	.09		.30 **	.09	
R <sup>2</sup>		.20 ***			.24 **	
	***p<.001	**p<.01	*p<.05			

benefit individuals with less real life exposure to music piracy; individuals who associate with others who pirate music engage in high levels of piracy regardless of their level of self-control.

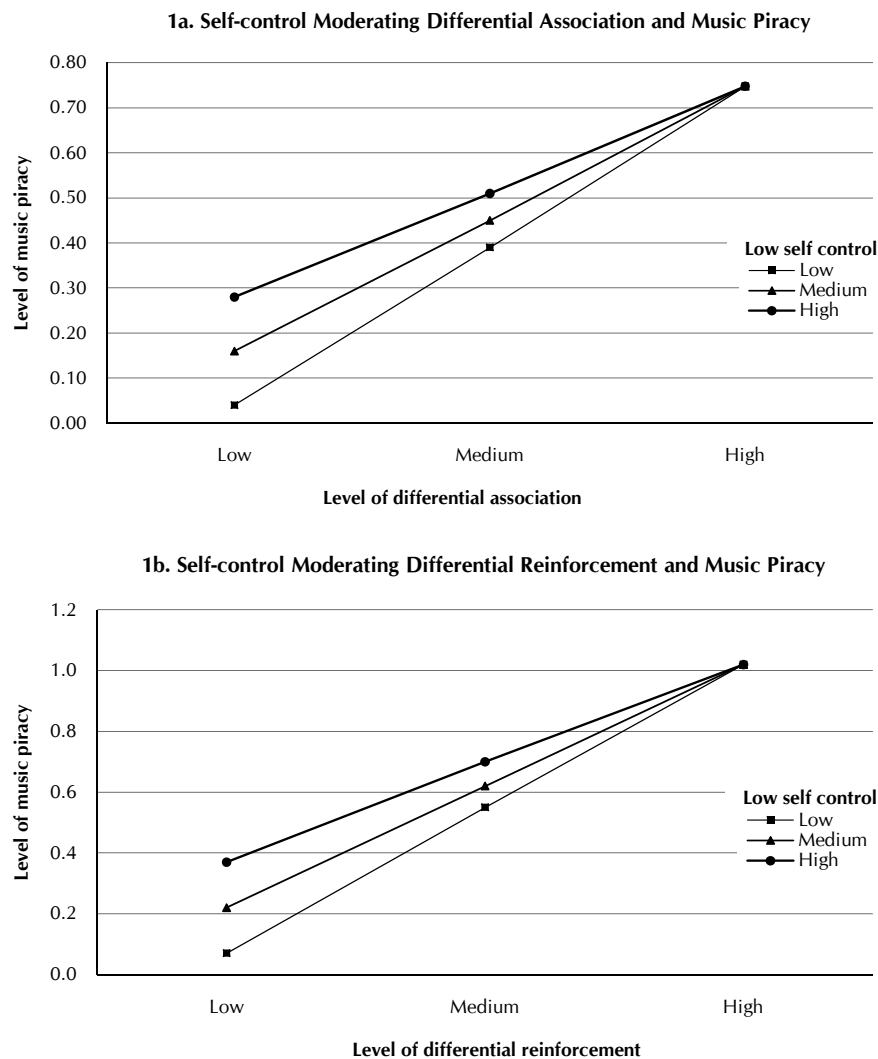
Figures 1b and 1c illustrate the nature of the conditional effects of self-control and beliefs regarding piracy laws on differential reinforcement and levels of piracy. Again, self-control has the greatest impact under low levels of differential reinforcement. Individuals who do not perceive or experience positive rewards from pirating music report differential levels of piracy depending upon their level of self-control. In these cases, those with low self-control also report higher levels of music piracy than those with greater self-control. In this sense, greater

self-control acts as a buffer against the effect of perceived rewards on music piracy under conditions of low reinforcement.

In contrast, beliefs regarding piracy laws exert their greatest impact under high levels of differential reinforcement. Those who find that pirating music is highly rewarding report differential levels of piracy depending upon their views of piracy laws. At this level, individuals who do not believe in the legality of piracy report higher levels of piracy than those who hold more views favorable to the law.

Figure 1d shows the nature of the interaction of beliefs on imitation and music piracy. Here, a small “fan effect” is seen at high levels of imitation. Those with greater ex-

**Figure 1. Graphical Presentation of Interaction Effects (Part 1)**



posure to piracy through online and media sources report differential levels of piracy depending upon their beliefs in piracy law. Those with beliefs unfavorable to the law tend to report higher levels of piracy at this level. Thus, belief in piracy laws tends to act as a weak buffer against the effect of online exposure on music piracy when such exposure is high.

When examining the independent effects across all eight models, support is consistently found for the four learning variables, low self-control, and ethical beliefs. When holding the moderating variables at their means, the effects of the learning components are both significant and positively related to music piracy. Likewise, when holding the learning components at their means,

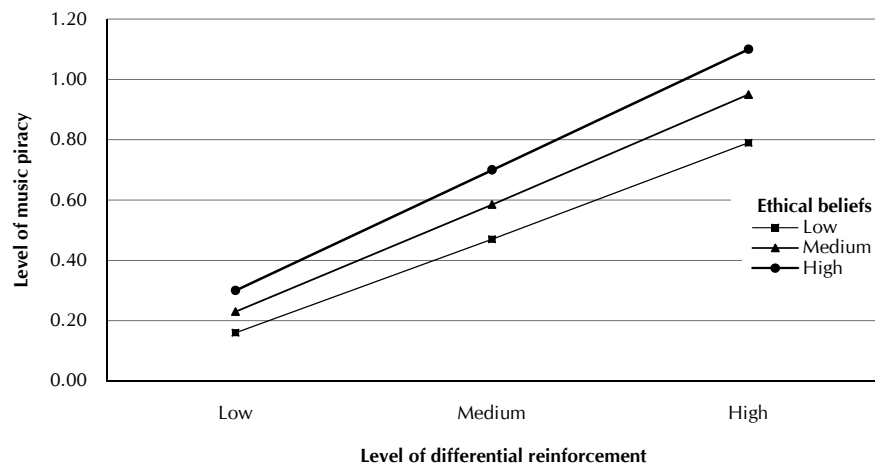
low self-control and ethical beliefs are also generally significant and positive (self-control in Models 5 and 7 are exceptions). Consistent, positive effects are also found for gender, type of Internet connection, and Internet proficiency indicating that these control variables are also important predictors of music piracy.

## Conclusion

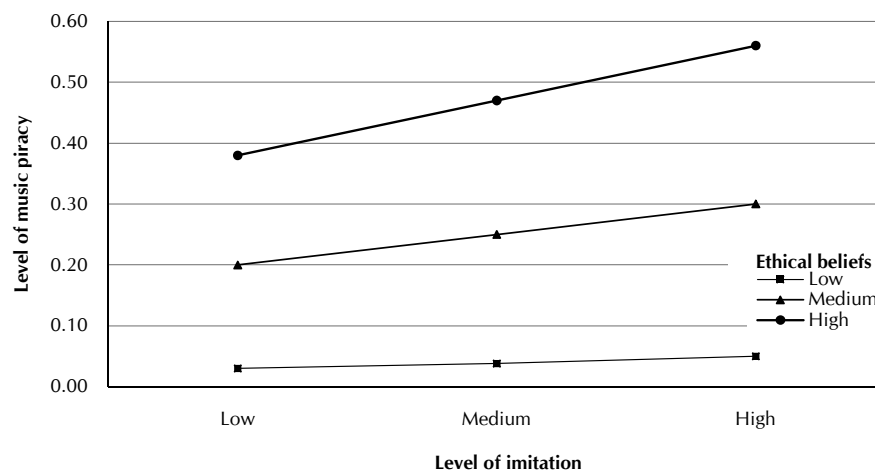
The current study set out to explore the interactive effects that the components of social learning theory, individual self-control, and ethical beliefs in the law have on levels of music piracy. Specifically tested was whether relationship between one's exposure to, and reinforce-

**Figure 1. Graphical Presentation of Interaction Effects (Part 2)**

### 1c. Ethical Beliefs Moderating Differential Reinforcement and Music Piracy



### 1d. Ethical Beliefs Moderating Imitation and Music Piracy



ment of, music piracy varied as a function of more stable psychological traits and beliefs. The results indicated that self-control conditioned the effect that differential association and differential reinforcement had on levels of music piracy. Similarly, ethical beliefs in piracy laws conditioned the effect that differential reinforcement and imitation had on levels of music piracy. Before policy implications for these findings are discussed, some limitations of the study must be noted.

First, a probability sampling technique was not utilized. While the characteristics of the current sample allow for sufficient examination of music piracy among college students, it is not representative of the total population of college students. Accordingly, conclusions should be drawn only for the current population under study. Nonrespondent bias may have occurred in that those who had pirated music may have been less forthright in their responses than those who did not because of its inherently questionable nature (Seale, Polakowski, and Schneider 1998). Self-serving bias – where individuals demonstrate a tendency to view themselves more favorable than not – may also have been evident among respondent's choices (Babcock and Loewenstein 1997; Cross 1977).

Certain problems were present regarding the measurement of self-control. This was likely due to the fact that only one measure for each of the six traits was taken, increasing the likelihood for the presence of measurement error. The fact that only three of the six dimensions were found to load on a single factor further indicates that our measure may not have fully tapped the concept. Unfortunately, it was not possible to utilize all twenty-four measures of the Grasmick et al. (1993) scale due to the need to constrain the length of the survey. The six self-control measures that *were* used were selected based on the findings of the pretest.

Relatedly, some of the negative findings associated with the interaction terms where self-control was included as the moderating variable contradict prior findings that suggest a positive interaction with both occupational delinquency (Gibson and Wright 2001) and software piracy (Higgins and Makin 2004). These findings may be due to the fact that self-control and differential reinforcement and differential association were negatively correlated. Again, this may be due to the dimensions of self-control assessed. For example, students who are more self-centered – which corresponds to one of the three dimensions included in the measure—may in general have fewer friends in real life, which could account for the negative correlations.

A few final points are worthy of mention. The criminal justice students in the pretest may have been atypical

of their peer group and perhaps more sensitive to questions related to deviance or crime. The possibility also exists that overall music piracy participation may have been underreported due to the tendency of individuals to provide socially desirable answers (Seale, Polakowski, and Schneider 1998). Recall bias may have affected the accuracy of responses (Himmelweit, Biberian, and Stockdale 1978; Horvath 1982; Morgenstern and Barrett 1974). All of these limitations should be taken into account when interpreting the results of the study.

In spite of these limitations, participation in IP theft appears to be highly influenced by social learning components. The impact of these external factors also appears, to a certain extent, to be conditioned by self-control and morality – which are both internal and less variable in nature. Tittle (1980) has stated that levels of wrongdoing may be decreased if laws are crafted and made known defining the behavior as illegal and prescribing penalties for its violation. The frequency and extent of IP theft online, however, is not sizably reduced through the reactive litigious strategies employed by the music recording industry (Bowman 2003; CNN.com 2004; Dean 2003). The behavior of software pirates tends to be policed by their conscience (e.g., Athey 1993; Athey and Plotnicki 1994; Landsheer, Hart, and Kox 1994), and perceptions related to moral appropriateness (Glass and Wood 1996; Higgins and Makin 2004; Kini, Ramakrishna, and Vijayaraman 2004; Seale, Polakowski, and Schneider 1998; Solomon and O'Brien 1990; Taylor and Shim 1993; Thong and Yap 1998) seem to meaningfully inhibit pressures from sources of behavioral learning. As such, strategies that enhance moral misgivings and that sensitize society to them may be the only viable solution. This can occur through ethics modules in introductory information technology classes, increased oral and written reminders that prick the conscience and remind individuals of acceptable computer and network usage, and increased awareness of recording industry and recording label employees (such as audio engineers, album producers, and marketing professionals) who are victimized when piracy undercuts the profit from CD album sales and legal music downloads that supports their paychecks.

Tyler (1996) argues that individuals will cooperate with laws they believe are legitimate and that cohere with their conceptions of what is right. On the surface, it seems too difficult to address such a fundamental belief and behavior pattern among members of a society that have become accustomed to obtaining software, movies, music, and information for free on the Internet. Nonetheless, it appears essential if respect for intellectual property is to be engendered and maintained, which consequently will



improve not only the economic and creative vitality of America, but also its moral fabric as well.

## Endnotes

1. For the scope of the current work and the constructs we are testing, we interchangeably use terms such as “morality” and “ethics” (or “moral beliefs” and “ethical beliefs”). We believe that such usage is appropriate in order to connect this research to the larger body of criminological literature on moral beliefs.

2. Self-control can be measured by focusing on an individual’s attitudes and tendencies, or on specific actions in which he or she participates. Pratt and Cullen’s (2000) meta-analysis identified eighty-two attitudinal measures and twelve behavioral measures of self-control, and found evidence demonstrating that employing one type of measure over the other will not significantly affect the predictive capacity of self-control. The choice was therefore made to utilize attitudinal measures because they are more aptly characterized with ethical beliefs towards law than are specific actions that demonstrate self-control.

3. To measure Internet proficiency, the respondent was asked how many of the following he or she had done: “changed my browser’s ‘startup’ or ‘home’ page,” “made a purchase online for more than \$100,” “participated in an online game,” “participated in an online auction,” “changed my ‘cookie’ preferences,” “participated in an online chat or discussion (not including email, ICQ, or AOL Instant Messenger, or similar instant messaging programs),” “listened to a radio broadcast or music clip online,” “made a telephone call online,” “created a web page,” and “set up my incoming and outgoing mail server preferences.”

4. Aiken & West (1991) suggest that subtracting the means from each subject’s individual value on both predictors before computing the product term can be useful in addressing problems associated with multicollinearity and the interpretation of regression coefficients.

5. It should be noted that when examining interaction effects, their exact contribution to the analysis should be assessed to determine if their inclusion explains a significantly greater portion of the variance than more parsimonious models which excludes the interaction terms. This is done by conducting F tests comparing the proportion of variance explained by the full models with interaction effects to the restricted models excluding them

(Allen, 1997:120). Such tests were conducted for the four models with significant interaction effects, and the results (available upon request) indicated that including the interaction terms explained a significantly greater proportion of variance than their respective, restricted model. Specifically, the F tests were as follows: Differential Association and Low Self-Control ( $F=13.72$ ;  $p<.01$ ); Differential Reinforcement and Low Self-Control ( $F=21.07$ ;  $p<.01$ ); Differential Reinforcement and Ethical Beliefs ( $F=5.27$ ;  $p<.05$ ); and Imitation and Ethical Beliefs ( $F=6.02$ ;  $p<.05$ ). The results indicate that for these models, inclusion of the interaction terms significantly enhances their predictive capacity.

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## **Appendix A. Item Measures of Dependent and Theoretical Variables**

### **Level of Music Piracy**

**(Eigenvalue = 7.20, factor loadings > .59)**

Subjects were asked to respond to the following statements based upon their present and prior participation with illegal/unauthorized MP3s. Possible responses were based on a five-point Likert scale ranging from “0” to “More than 20” for questions 1, 5, 7, & 12; “0” to “More than 100” for questions 2, 4, 6, & 8; “0” to “More than 250” for question 3; “0” to “More than 1,000” for questions 9, 10, & 11; and “0” to “2,001+” for question 13.

- 1) How many MP3 files downloaded in the last week?
- 2) How many MP3 files downloaded in the last month?
- 3) How many MP3 files downloaded since the beginning of 2003?
- 4) How many MP3s do you, on average, download per month?
- 5) How many did you download in an average week exactly one year ago?
- 6) How many did you download in an average month exactly one year ago?
- 7) How many did you download in an average week exactly two years ago?
- 8) How many did you download in an average month exactly two years ago?
- 9) How many MP3 files did you personally download in 2002?
- 10) How many MP3 files did you personally download in 2001?
- 11) How many MP3 files did you personally download in 2000?
- 12) How many total complete music albums in MP3 format have you obtained online?
- 13) How many total MP3s have you downloaded over the course of your life thus far?

### **Social Learning Components**

Subjects were to consider their participation with illegal/unauthorized MP3s and indicate their level of agreement to the questions based on a five-point Likert scale ranging from Strongly Disagree (1), Disagree (2), I do not participate with MP3s (3), Agree (4) and Strongly Agree (5).

### **Differential Association (Real Life Exposure)**

**(Eigenvalue = 2.42, factor loadings > .70)**

- 1) My friends support my MP3 usage.
- 2) I associate with others in real life (e.g. offline) who are supportive of my MP3 usage.
- 3) I was introduced by another person in real life to MP3s.
- 4) I have learned the techniques of using MP3s from my friends.

### **Differential Reinforcement**

**(Eigenvalue = 2.84, factor loadings > .80)**

- 1) It is a great benefit to sample new music through MP3s.
- 2) It is a great benefit to be able to transfer assorted MP3s onto an audio/data CD or a portable MP3 player so that I can have music on-the-go.
- 3) It makes me feel good to download a song that I have wanted.
- 4) It is a great benefit to me to be able to access music freely.

### **Imitation (Online/Media Exposure)**

**(Eigenvalue = 1.69, factor loadings > .58)**

- 1) I have learned the techniques of using MP3s from television or print media.
- 2) I have learned the techniques of using MP3s from online sources (web pages, chat rooms).
- 3) I associate with others online who exchange MP3s with me.

### **Definitions**

**(Eigenvalue = 1.99, factor loadings > .66)**

- 1) One of the reasons I download MP3s is because I \*will not\* purchase the music.
- 2) One of the reasons I download MP3s is because I feel the recording industry has been overcharging the general public for music tapes and CDs.
- 3) One of the reasons I download MP3s is because many musicians and the recording industry make millions of dollars anyway, and downloading MP3s of their songs does not really cut into their income.
- 4) One of the reasons I download MP3s is because I think music should be free.

### **Self-Control**

**(Eigenvalue = 1.09, factor loadings > .58)**

Respondents were asked to reflect on their personality and indicate their level of agreement for each statement. Potential responses were based on a five-point Likert scale ranging from: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), or Strongly Agree (5). Items were coded so that higher scores represented lower levels of self-control.

- 1) When things get complicated, I tend to quit or withdraw.
- 2) I try to look out for others first, even if it means making things difficult for myself.
- 3) I feel better when I am on the move rather than sitting and thinking.

### **Belief in Piracy Laws**

**(Eigenvalue = 2.24, factor loadings > .71)**

Respondents were asked to consider situations and circumstances which would make them more likely to participate with illegal/unauthorized MP3s:

- 1) since there are no clear-cut rules, laws, regulations, or even guidelines when it comes to MP3 file exchange.
- 2) because any rules or laws that seek to prevent individuals from exchanging MP3s are misguided and ill-conceived.
- 3) if it were known that law enforcement agencies, universities, and authorities in general couldn't care less about MP3 file exchanges, lack adequate abilities to detect, or combat the activity or have bigger things to worry about.
- 4) Because hardly anyone has been caught or punished or has been subject to even the slightest repercussions for Internet distribution.

Potential responses were based on a five-point Likert scale ranging from: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), or Strongly Agree (5).

# Self-Control and Ethical Beliefs on the Social Learning of Intellectual Property Theft

## Appendix B. Correlations among Study Variables

	LMP (Y)	DA (X1)	DR (X2)	I (X3)	D (X4)	LSC (X5)	LSCxDA (X6)	LSCxDR (X7)	LSCxI (X8)	LSCxD (X9)	EB (X10)	EBxDA (X11)	EBxDR (X12)	EBxI (X13)	EBxD (X14)	M (X15)	W (X16)	A (X17)	IC (X18)	IP (X19)
(Y)	1.00																			
(X1)	.33 **	1.00																		
(X2)	.45 **	.68 **	1.00																	
(X3)	.11 **	-.04 *	-.01	1.00																
(X4)	.14 **	.22 **	.23 **	.26 **	1.00															
(X5)	.05 *	-.08 **	-.08 **	.00	.06 **	1.00														
(X6)	-.05 *	.06 **	.08 **	.00	.07 **	.00	1.00													
(X7)	-.02	.07 **	.15 **	.01	.05 *	-.02	.74 **	1.00												
(X8)	-.02	.01	.01	-.05 *	.03	.08 **	.01	.00	1.00											
(X9)	.03	.07 **	.05 *	.03	.01	.02	.28 **	.25 **	.24 **	1.00										
(X10)	.27 **	.39 **	.38 **	.15 **	.37 **	-.01	.04 *	.04	-.01	.04	1.00									
(X11)	-.05 *	-.18 **	-.24 **	.02	.01	.04	-.12 **	-.13 **	-.03	-.07 **	-.07 **	1.00								
(X12)	-.07 *	-.23 **	-.34 **	.04	-.02	.04	-.13 **	-.13 **	-.02	-.05 *	-.12 **	.78 **	1.00							
(X13)	.10 **	.02	.05 *	.14 **	.02	-.01	-.02	-.01	.03	.04	.07 **	.15 **	.12 **	1.00						
(X14)	.08 **	.01	-.02	.02	.12 **	.03	-.03	-.02	.05	.02	.00	.35 **	.33 **	.39 **	1.00					
(X15)	.30 **	.05 *	.09 **	.09 **	.03	.04	-.01	.01	.00	-.02	.05 *	.03	.03	.07 **	.06 **	1.00				
(X16)	.05 *	.15 **	.10 **	-.12 **	.03	-.06 **	.03	.03	.02	.03	.08 **	-.03	-.03	-.01	.02	.02	1.00			
(X17)	.03	-.08 **	-.09 **	.02	.02	-.02	-.05 *	-.05 *	-.02	.02	-.06 **	.02	.03	-.03	.02	.03	.00	1.00		
(X18)	.17 **	.17 **	.21 **	-.05 *	.02	-.01	-.02	-.01	-.01	-.01	.10 **	-.08 *	-.08 **	.03	.04	.03	.18 **	-.11 *	1.00	
(X19)	.34 **	.13 **	.18 **	.06 **	.01	.03	.00	.02	-.03	-.01	.05 *	.01	-.01	.05 *	.08	.24 **	.10 **	.08 *	.13 **	1.00

\*\*p < .01

\*p < .05 (two-tailed)

LMP = Level of Music Piracy  
DA = Differential Association  
DR = Differential Reinforcement

I = Imitation  
D = Definitions  
LSC = Low Self-Control

EB = Ethical Beliefs  
M = Male  
W = White

A = Age (+20)  
IC = Internet Connection  
IP = Internet Proficiency

## Family Structure and Parental Behavior: Identifying the Sources of Adolescent Self-Control

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**Abstract.** *According to Gottfredson and Hirschi and their general theory of crime (1990), self-control – defined as the degree to which individuals are vulnerable to temptation – is a relatively stable, universal trait that accounts for individual differences in criminal, deviant, and reckless behavior. Self-control is said to develop in early childhood, while the family is still the most important socializing agent. Thus, the absence of self-control and subsequent deviant activity are a result of familial factors. Using a large, nation-wide sample of Canadian children, this study examines the effect of parenting on children's self-control while considering the role of such factors as parental composition and household size. Analyses reveal that self-control varies by family structure, whereby children living with two biological parents report higher levels of self-control than children in reconstituted and single parent families. However, this relationship is offset, in part, by parental monitoring. Overall, regardless of family structure, it is evident that a nurturing, accepting family environment is positively associated with self-control.*

**Keywords:** self-control; adolescence; family structure; parental behavior

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### Introduction

Gottfredson and Hirschi's assertion that their general theory of crime explains "all crime, at all times and, for that matter, many forms of behavior that are not sanctioned by the state" (1990:117) has proven to be one of the most controversial claims made by criminologists in recent years. According to Gottfredson and Hirschi, self-control, defined as the degree to which individuals are vulnerable to temptation, is a relatively stable, universal trait that accounts for individual-level differences in criminal, deviant, and reckless behavior. Indeed, they use the term synonymously with criminality, or the propensity to commit crime, giving an indication of how large the role of self-control is thought to play in the commission of criminal acts. Later, they soften their assertions about the primacy of self-control; age, gender, and race are also said to be important determinants of criminal activity (Hirschi and Gottfredson, 1995). Nevertheless, self-control is thought to be the primary social characteristic that leads to crime and delinquency. To be sure, Gottfredson and Hirschi express in no uncertain terms, low self-control is "the individual-level cause of crime" (1990:232).

Gottfredson and Hirschi (1990) argue that their theory of crime is general in that it accounts for a multi-

tude of criminal and noncriminal behaviors that transcend cultural boundaries. They define crime as any act of "force or fraud undertaken in the pursuit of self-interest" (1990:15). Crime, then, is not restricted by definition to those activities that violate the laws of a particular society at a particular point in time. The authors contend that, because their definition of crime does not follow cultural, behavioral, or legalistic guidelines, the general theory is valid across time and space. That is, low self-control is the primary cause of all types of crime and deviance, at all times and in all cultures. Furthermore, self-control is said to develop in early childhood, while the family is still the most important socializing agent. The absence of self-control, the authors contend, is therefore a result of familial factors. It is this aspect of the general theory that is the focus of the present investigation. While the contention that low self-control leads to criminal and analogous acts has received much empirical attention, the claim that the family is the source of low self-control has to date been of less interest to criminology researchers. As will be discussed in further detail, research that has sought to test this latter proposition is contradictory and offers only a modest degree of support for the general theory.

## **Self-Control**

Central to the general theory of crime is the assumption that humans have an innate tendency to seek immediate gratification of desires. The sense of urgency to satisfy such desires, however, varies across individuals; that is to say, some individuals are better able to delay gratification than others. According to Gottfredson and Hirschi, those who are especially sensitive to immediate pleasure are more likely to engage in crime than others, despite its apparent long-term negative consequences, because of the “immediate, easy, and short-term pleasure” that crime offers (1990:41). The authors label the trait responsible for the variation in the likelihood of engaging in criminal acts “self-control.” Those high in self-control are better equipped to resist criminal impulses, while those with lower levels of self-control are more likely to succumb to temptation in order to attain the immediate pleasures associated with crime. Criminal behavior, however, does not stem solely from the absence of self-control. An additional, interrelated factor that influences criminal behavior is the degree of opportunity available to the actor. It is the interaction of low self-control with opportunity that leads individuals to commit crime: only those individuals who lack self-control and are presented with opportunities to commit crime will do so. Nevertheless, Gottfredson and Hirschi point out that, because opportunities to engage in criminal activity are generally abundant, crime commission arises first and foremost from the absence of self-control. As such, self-control should be considered prior to situational factors when examining the causes of criminal behavior.

Gottfredson and Hirschi’s general theory suggests that people lacking in self-control tend to (a) be short-sighted, with little interest in long-term pursuits; (b) enjoy exciting, risky, and adventurous activities; (c) have an impulsive, “here and now” orientation; (d) favor physical activities as opposed to cognitive ones; (e) be insensitive or indifferent to the needs of others; and (f) prefer to settle disputes through physical means rather than verbally (1990:89-91). These six dimensions are not separate indicators of self-control, but rather, these traits will tend to be found in the same people (Arneklev et al., 1999; Grasmick et al., 1993; Longshore, 1996; Polakowski, 1994). It is important to note, however, that these traits are not themselves motivators of crime; rather, they inhibit the individual’s ability to foresee the consequences of his or her actions. The long-term negative consequences of participating in crime do not negate its obvious benefits for the impulsive, short sighted, adventurous individual, thereby removing any barriers that may have prevented

the actor from committing crime.

Self-control, Gottfredson and Hirschi contend, develops early in childhood and remains highly stable over the life course. Because humans are inherently selfish with a propensity to seek pleasure and avoid pain, self-control will only develop if there is an effort, whether conscious or not, to teach it. Children must therefore learn self-control, and the burden of its teaching falls primarily on the shoulders of the family. The general theory asserts that three conditions are necessary in order for a child to develop self-control: Parents must monitor the child’s behavior, identify deviant behavior when it occurs, and correct or punish such behavior. Underlying each of these components is parental affection, for a parent who cares for the child will tend to watch the child and correct inappropriate behavior when it occurs (Hirschi, 1995). The stronger the parent-child bond, the more likely this will happen. Conversely, the weaker the bond, the less motivated the parent will be to nurture the child.

Gottfredson and Hirschi’s emphasis on the importance of parenting to the development of self-control among children is consistent with Baumrind’s influential theory of authoritative parenting (1966, 1991, 1996). The crux of Baumrind’s theory is that demanding and responsive parenting is crucial to positive child outcomes. The former refers to supervision, discipline, and a willingness to confront the child who disobeys, while the latter has to do with being supportive, attuned, and agreeable to children’s needs (1991). Baumrind contends that children with demanding and responsive (i.e., authoritative) parents will be more socially competent, and hence have higher self-control, than children whose parents are lacking one or both of these parenting styles.

Nonetheless, a parent who cares for and disciplines his or her child may be insufficient for instilling self-control. Barriers can arise which may hinder the parent’s ability to satisfy the conditions for effective child-rearing. The general theory focuses specifically on two structural factors that have well documented effects on delinquency: family size and family structure (Gottfredson and Hirschi, 1990; Hirschi, 1994; 1995). With respect to the former, Gottfredson and Hirschi argue that that “one of the most consistent findings of delinquency research is that the larger the number of children in the family, the greater the likelihood each of them will be delinquent” (1990:102; see also, Sampson and Laub, 1993). In order to account for such findings, the general theory makes two claims. First, the more children there are in the family, the less time, energy, and financial resources parents will have to devote to each individual child. They will be less able to directly or indirectly supervise each child’s



behavior and subsequently punish deviant behavior when it occurs. Hirschi (1994) later added that family size is itself an indicator of parental self-control. In brief, parents low in self-control will pass this characteristic on to their offspring via their inability or unwillingness to fulfill all of the conditions necessary for adequate socialization.

In terms of family structure and its impact on deviance, Hirschi (1994) contends that it is better to have two parents than one. The single parent must invest a good deal of time and energy into parenting practices that are, at least in part, shared by the two-parent family. The single parent therefore faces special challenges when it comes to child rearing. Without the assistance of a second parent or guardian, and perhaps without social support, the single parent must engage in the same practices as any other to raise the child effectively. The single parent too must supervise children and respond to problematic behavior. The higher rate of delinquency documented among children from single-parent households as compared to intact households (Cookston, 1999; Lipman et al., 1996; Rankin and Kern, 1994) suggests that it may be more difficult for single-parents to meet the requirements necessary to instill self-control within their children (Gottfredson and Hirschi, 1990; Hirschi, 1994).

While two parents in the household, whether biological or step, make monitoring and discipline easier than for single-parents, reconstituted families face a different set of problems. Stepparents may not be as closely bonded to the child as a natural parent (see, for example, White, 1999), thereby reducing the likelihood that the stepparent will be motivated to adequately socialize the child. In their influential work, *Homicide*, Daly and Wilson (1988) hypothesized that children living with non-genetic parents are at a higher risk of being killed by a parent than are children living with biological parents because stepparents are less motivated care to for their children. The presence of a stepparent may therefore increase the likelihood that children will be exposed to a hostile or indifferent family environment. Although much research indicates that children from single-parent and reconstituted families participate more frequently in delinquent activities than do children from intact families (Cookston, 1999; Gove and Crutchfield, 1982; Hoffman, 2001; Pierret, 2001; Rankin, 1983; Rankin and Kern, 1994; Wells and Rankin, 1991), Demuth and Brown (2004) recently revealed that family factors such as parental closeness, involvement, supervision, and monitoring attenuate the effects of family structure on delinquency. Their study, however, did not contain any measures of self-control.

## Self-Control and Deviant Behavior

It is hardly a surprise that the ambitious claims made by Gottfredson and Hirschi (1990) have made the general theory of crime a target of much theoretical and empirical criticism (Akers, 1991; Entner Wright et al., 1999; Geis, 2000; Greenberg et al., 2002; Marenin and Reisig, 1995; Miller and Burack, 1993). An impressive amount of research has emerged that has tested the core propositions of the theory, the bulk of which has focused on Gottfredson and Hirschi's contention that individuals lacking in self-control will engage in crime and analogous acts at higher rates than those who possess greater levels of self-control. Despite criticisms, findings have generally been supportive of the theory. In their meta-analysis, Pratt and Cullen (2000) summarized the results of 21 empirical studies in order to determine the aggregated effect of self-control on crime. Results of their analysis provided strong empirical support for the general theory, finding that low self-control has a statistically significant mean effect size of .27. The authors concluded that low self-control is "one of the strongest known correlates of crime. . . . [F]uture research that omits self-control from its empirical analysis risks being misspecified" (p. 952).

Researchers have consistently documented a significant negative association between both attitudinal and behavioral measures of self-control and crime among adults and adolescents (Brownfield and Sorenson, 1993; Burton et al., 1999; Evans et al., 1997; LaGrange and Silverman, 1999; Nakhaie et al., 2000; Paternoster and Brame, 1998). More specifically, significant negative relationships have been found to exist between self-control and "imprudent" behaviors, such as smoking, drinking, gambling, and speeding (Arneklev et al., 1993; Burton et al., 1999), drinking and driving (Keane et al., 1993), adolescent drug use (Sorenson and Brownfield, 1995; Wood et al., 1993), accidents (Junger and Tremblay, 1999; Pulkkinen and Hamainen, 1995; Tremblay et al., 1995), class cutting among university students (Gibbs and Giever, 1995), childhood aggression and misconduct (Brannigan et al., 2002), white collar crime (Benson and Moore, 1992), relationship violence (Sellers, 1999), and intentions to deviate (Piquero and Tibbetts, 1996).

Despite considerable research attention, many of the key propositions of the general theory are empirically underdeveloped. Gottfredson and Hirschi's contentions surrounding the stability and dimensionality of self-control, the role opportunity plays in the commission of criminal acts, offender versatility, and the source of self-control have received much less attention. Ambiguity persists concerning the resistance of self-control to change in

later life (Arneklev et al., 1999; Tittle and Grasmick, 1998; Tittle et al., 2003), whether the six elements of self-control form a unidimensional or a multidimensional construct (Grasmick et al., 1993; Longshore et al., 1996; Piquero and Rosay, 1998; Piquero et al., 2000; Vazsonyi et al., 2001, and Wood et al., 1993), the proposed interaction between opportunity and self-control (Burton et al., 1998; LaGrange and Silverman, 1999; Longshore, 1998), and whether those with low levels of self-control will tend to avoid specializing in any particular criminal or analogous behavior (Benson and Moore, 1992; Forde and Kennedy, 1997; Gibbs and Geiver, 1995; Gibbs et al., 1998; Junger et al., 2001; Longshore et al., 1996; Paternoster and Simpson, 1996; Piquero and Tibbetts, 1996; Polakowski, 1994; Pratt and Cullen, 2000; Sorenson and Brownfield, 1995). Furthermore, only a handful of studies have been conducted that examine parenting as the main source of self-control (Cochran et al., 1998; Feldman and Weinberger, 1994; Gibbs et al., 1998; Hay, 2001; Polakowski, 1994).

The significance of parental attachment to self-control, and parental monitoring and discipline to self-control has been noted by some (Cochran et al., 1998; Gibbs et al., 1998; Hay, 2001; Polakowski, 1994). On the other hand, Feldman and Weinberger (1994) found little relationship between parenting practices and adolescent boys' self-restraint. Although these studies make important contributions by focusing attention on parenting practices and self-control, they also have some limitations. Each of the studies had fairly small sample sizes, ranging from 81 to 448 participants, with limited geographic coverage. Further, three of the five studies used nonrandom, convenience samples (Cochran et al., 1998; Gibbs et al., 1998; Hay, 2001), two of which consisted of undergraduate students who should be expected to have fairly high levels of self-control. In four of the five studies, the researchers did not include all of the necessary conditions for effective parenting as stipulated by the general theory. Two did not use measures of parental affection for the child (Gibbs et al., 1998; Polakowski, 1994), and only one (Cochran et al., 1998) included a measure for the recognition of inappropriate behavior. Finally, Feldman and Weinberger's (1994) research was not a direct test of the general theory and therefore did not attempt to operationalize Gottfredson and Hirschi's definitions of self-control and parental effectiveness.

Overall, the literature provides a modest degree of support for the core propositions of the general theory, though the results are not unequivocal. In terms of the impact of parental effectiveness on self-control, the relative shortage of research, the limitations of existing stud-

ies, and the inconsistent results warrant further empirical examination. Following the suggestion of Paternoster and Brame (1998:661-662) that researchers should investigate not only the consequences of low self-control but also its causes, the present study aims to contribute to the current body of research in ways that differ from previous approaches. Using a large, nation-wide sample of Canadian children, we examined the effect of parenting on children's self-control while taking into consideration family size and parental composition. Based on the propositions of the general theory, the following hypotheses were tested:

Hypothesis 1: Factors representing effective parenting practices should have a significant and positive impact on children's self-control, while measures of ineffective parenting should be negatively correlated with self-control. This finding should hold across gender and family structure.

Hypothesis 2: Levels of self-control should vary according to gender and family type. Females and children from intact families should demonstrate the highest degree of self-control. Males and children from single-parent and step-families should have lower levels of self-control.

Hypothesis 3: Factors previously determined to be significantly related to delinquent or deviant behavior, such as family type, family size, and socio-economic status, should have a negligible impact on self-control when controlling for parental effectiveness.

## **Data and Methods**

The data are from the National Longitudinal Survey of Children and Youth (NLSCY), Cycles 1 and 3. Conducted by Statistics Canada, the NLSCY was designed to measure the development and well-being of Canadian children as they grow from infancy through to adulthood with the goal of helping policy makers create effective programs for children at risk. Information was gathered from parents, teachers, and children concerning various social, biological, and economic characteristics. The first cycle was conducted in 1994-1995; since then, four additional waves have been released. Waves one, two and three are currently available for public use; data from waves one and three were included in the present analysis.<sup>1</sup>

Data from 13,439 households were collected at wave one from a variety of respondents using different data collection techniques. Basic demographic informa-

tion about each household member was obtained from a knowledgeable household member. Once completed, one child aged 0 to 11 years living in the household was randomly selected and the person most knowledgeable (PMK) about that child was then asked to complete a set of three questionnaires: the Parent Questionnaire, the Child Questionnaire, and the General Questionnaire. Additional children belonging to the same economic family were then chosen at random and the Child Questionnaire was completed by the PMK for each child. In 91.8 percent of the cases, the PMK was the child's mother.

The present study also utilized self-reported data collected at wave three from children aged 10 to 15, which was collected four years after the initial survey. The use of self-reported survey data is consistent with previous research on the general theory (Evans et al., 1997; Grasmick et al., 1993; LaGrange and Silverman, 1999). Further, given the objectives of this study, it was decided that self-reported data would be more informative than data collected from the PMK, particularly for the parenting variables. Take, for instance, the previously discussed relationship between parental supervision and delinquent behavior. Where the parent might state that he or she is not always aware of his or her child's whereabouts, the child might believe that the parent does in fact monitor his or her behavior at all times. As a result, the child may take care not to engage in activities that could result in disapproval or punishment. In this case, using parent-reported data on child supervision would generate very different results than data collected from the child. The child's awareness of parenting and parent-child relations was thus determined to be more relevant to this research, for any behavioral responses associated with particular parenting practices would necessarily rely on how the child perceives or internalizes those practices (Hirschi, 1969; Webb, Bray, Getz, and Adams, 2002). For the sake of consistency, self-reported data were used whenever possible.

Self-reported data at wave three were collected only from respondents aged 10 to 15. In total, 5,539 participants aged 10 to 15 were included in the NLSCY sample. Of this subsample, 2,663 were males (48.1%) and 2,876 were females (51.9%). Elimination of missing cases using listwise deletion resulted in a working sample size for this study of 3,927. In order to derive meaningful estimates, survey weights provided in the public data file were used. Weights were normalized to return the sample to its original size.

### *Dependent Variable*

The dependent variable, self-control, was measured using a 17-point self-report hyperactivity/inattention scale constructed by Statistics Canada using items drawn from the Ontario Child Health Study and the Montreal Longitudinal Survey. In previous research, Brannigan and colleagues (2002) used a parent-report version of the same scale as an indicator of self-control and we agree with the authors that it is a good approximation of the construct as outlined by Gottfredson and Hirschi. Children were asked to respond to a series of eight statements having to do with such behaviors as impulsivity, distractibility, and inattention (Cronbach's  $\alpha = .75$ ). Possible responses included 1 = never or not true, 2 = sometimes or somewhat true, and 3 = often or very true (scale items are presented in Appendix A). For the purposes of the present study, the variable was coded such that the higher the score on the scale, the higher the level of self-control.

### *Independent Variables*

The NLSCY contains several questions that comprise a scale intended to measure children's perceptions of the parent-child relationship and parental supervision. The scale was developed by Lempers et al. (1989) and was previously used in the Western Australia Child Health Survey. Participants were asked to respond to a total of 17 Likert-type statements designed to assess whether the respondents' parents behaved in punitive, nurturing, and/or consistent ways. Possible responses ranged from one (never) to four (very often). A factor analysis conducted by Statistics Canada revealed three factors: parental nurturance, parental rejection (or negligence), and parental monitoring (see Appendix A for scale items). The scales consist of items that correspond to the parenting practices identified by Gottfredson and Hirschi as necessary for the development of self-control and all three were included in the present analysis. The scales can also be seen as reflecting elements of direct and indirect parental control (Demuth and Brown, 2004; Nye, 1958). Parental nurturance was a 29-point scale consisting of five items that measured the amount of affection the parent shows the child, including how often parents smile at and praise the child, and whether the child feels appreciated (Cronbach's  $\alpha = .88$ ). Higher scores indicate higher degrees of nurturance. This scale was included in the present analysis as an indicator of parental affection.

Parents' supervision and recognition of inappropriate behavior were measured using the parental monitoring scale (Cronbach's  $\alpha = .57$ ). Parental monitoring was a 21-point scale that included four questions related to

parents' knowledge about children's whereabouts and activity restriction, as well as one question that tapped into recognition of misbehavior. Higher scores on the parental monitoring scale correspond to greater levels of parental supervision and recognition of misbehavior.

Finally, parental rejection, or negligence, was a 29-point scale containing seven items that gauge parents' disciplinary techniques (Cronbach's  $\alpha = .73$ ). Children were asked questions related to how consistently their parents enforced rules. The higher the score, the more likely parents were to inconsistently discipline the child for incorrect behavior or ignore it altogether. The parental rejection scale was included as a measure for disciplining misbehavior. Higher scores on the scale correspond to higher levels of inconsistent discipline.

Two questions regarding family structure and number of children in the household were also included in the analysis. For family structure, the PMK was asked to indicate with whom the child lives. To examine the impact of family structure on self-control, answers were recoded to create three categories: intact, reconstituted, and single-parent. Previous research supports this approach. The findings of Rankin (1983) and Wells and Rankin (1986) indicate that the "broken versus intact" dichotomy traditionally used in criminology research is not a sufficient operational definition of family structure. Simply put, too much information was lost when family composition was reduced to only two categories. Based on empirical tests of delinquency rates, the authors recommended a four-category classification of family structure: intact, single-parent, stepparent, and neither parent present. In order to better capture the effect of family structure on self-control, then, the simple "broken versus intact" dichotomy was rejected in favor of a measure that is more representative of the kinds of families that children experience today.

Intact families were those families in which both biological or both adoptive parents were present. Single-parent families were those in which one guardian was present in the household, either biological or non-biological. And reconstituted families consisted of those households in which two guardians were present, at least one of whom was a step, adoptive, or foster parent. Of the children aged 10 to 15 included in the analysis, 66 percent belonged to intact families, 27 percent lived with single parents, and seven percent resided in reconstituted family households. To examine the general theory's claims about family composition, the relationship between parental effectiveness and self-control was examined for each type of family.

Family size was measured using a question in the

dataset that asked about the number of children aged 0 to 17 in the household. For confidentiality reasons, the total number of children aged 0 to 17 in the household was capped at four in the NLSCY. Due to the small number of response categories, number of children in the household was treated as a categorical variable and dummies were created. One child was treated as the reference category.

In addition to measures of parental effectiveness, family structure, and family size, three control variables were included in the present study: gender, household income, and education of the PMK. For gender, males were coded as 0 and females were coded 1. Previous tests of the general theory have often included gender as a control variable (see, for example, Keane et al., 1993 and LaGrange and Silverman, 1999). The relationship between parental effectiveness and self-control was examined while controlling for gender, and, for exploratory purposes, interaction effects of gender with the parental effectiveness variables were also tested.

Turning to household income, prior research has shown that children of low SES families display higher levels of deviant and delinquent conduct than children of high SES families (Gove and Crutchfield, 1982; Rosen, 1985). It is therefore reasonable to conclude, based on the general theory, that SES influences parental effectiveness, which in turn impacts the development of self-control. Given the income disparity between single- and two-parent families, it was important to control for SES to eliminate the possibility that any difference in self-control found to exist between children reared in intact, single, and reconstituted families may instead be due to differences in SES. For the first cycle of the NLSCY, a measure of SES was derived for each household in the sample from five sources: level of education of the PMK and of his or her spouse partner (if applicable), PMK's occupational prestige and of the PMK's spouse or partner (if applicable), and household income. The SES score was calculated by taking the unweighted average of the five standardized variables. The result was a standardized measure of SES that ranges from -2.00 to +1.750, with larger values representing higher SES scores.

Education of the PMK was included as an indicator of parental self-control. According to Gottfredson and Hirschi (1990:96), the presence of low self-control is not conducive to the attainment of individual long-term pursuits. Low self-control impedes, among other things, educational achievement. It therefore follows that education is itself an indicator of self-control. Recall that the general theory suggests that parents lacking in self-control are less likely to instill self-control within their children. Including education of the PMK as a control



variable allowed for self-control of the PMK to be controlled. PMK's education was measured using a variable that asked about the highest level of education attained. Four categories were constructed: less than high school, high school, some post-secondary, and college or university degree. High school was treated as the reference category.

It is important to note that, for confidentiality reasons, it was necessary for Statistics Canada to suppress certain information for male PMKs with no spouse or partner in the household. One of the variables suppressed are relevant to the present analysis: PMK's education. Consequently, the single-parent category of the family structure variable is comprised only of those households headed by females.

## Results

Table 1 presents the descriptive statistics for our variables. Results indicate that two-thirds of all children

in the working sample came from intact families. Just over one-quarter are from single parent families and the remaining seven percent are from reconstituted family households. Forty percent of all children in our sample come from households with two children and another 38 percent are the only child. Fifteen percent have an additional two children living in the same household and only seven percent of households in our sample contained four or more children. With respect to the parenting variables, respondents reported overall high levels of nurturance and monitoring and low levels of rejection. Further, the average level of self-control was reasonably high, at 11.66 on a 17 point scale.

Tables 2a and 2b present the parenting and self-control scores broken down by family type and gender. Looking first at variation by family type, it can be seen that the mean scores on self-control for intact families is 11.70, for reconstituted families it is 11.72, and for single parent families it is 11.55. Analysis of variance (not shown) indicates that these differences are statistically significant ( $p < .05$ ). Thus, children from two parent families report significantly higher levels of self-control than children from single parent families. With respect to the parenting variables, levels of nurturance and rejection do not differ significantly by family type; however, this is not the case for parental monitoring. On average, children from reconstituted families report higher levels of monitoring (14.83) than children living in intact (14.68) and single-parent (14.65) households. This difference is highly significant ( $p < .001$ ).

Turning to gender, males have a mean self-control score of 11.48, while females report higher mean levels of self-control, at 11.82; the difference is statistically significant ( $p < .001$ ). There is also some variation in parenting scores by gender. Males, on average, report significantly lower nurturance scores ( $p < .05$ ) and higher monitoring scores ( $p < .001$ ) than females. The difference in rejection scores is not statistically significant.

Ordinary least squares (OLS) regression was used to analyze the effects of family type and parenting styles on self-control. The models were estimated in four steps: First, the effects of gender, number of children, SES, and PMK's education on self-control were tested. In the second model, the parent status dummy variables were added. For the third model, parenting variables were included in order to test whether the parent structure effect disappears when parenting process is included, as predicted by the general theory (hypothesis 3). Finally, interaction effects were added in the fourth model to test for differences in the effects of gender and parenting style by family type. Results are presented in Table 3.

**Table 1. Descriptive Statistics for Variables in the Analysis**

	Mean/ proportion
<b>Gender</b>	
Male	0.48
Female	0.52
<b>Number of children in the household</b>	
1 child	0.38
2 children	0.41
3 children	0.15
4 or more children	0.07
<b>PMK's education</b>	
High school	0.27
Less than high school	0.18
Some postsecondary	0.30
Secondary degree/diploma	0.24
Socio-economic status	0.35
<b>Family Type</b>	
Intact parent family	0.66
Stepparent family	0.07
Single parent family	0.27
<b>Parental nurturance</b>	21.13
<b>Parental rejection</b>	9.37
<b>Parental monitoring</b>	14.68
<b>Self-control</b>	11.66



**Table 2a. Comparison of Means for Parenting and Self-Control Variables by Family Type**

	Intact families		Reconstituted families		Single-parent families	
	Mean	Std. deviation	Mean	Std. deviation	Mean	Std. deviation
Parental nurturance score	21.03	5.63	20.99	5.90	21.43	5.27
Parental rejection score	9.44	4.81	9.46	5.02	9.17	4.46
Parental monitoring score ***	14.68	3.36	14.83	3.47	14.65	3.28
Self-control score *	11.70	3.18	11.72	3.00	11.55	3.17

\*\*\*p < .001    \*\*p < .050    \*p < .100

**Table 2b. Comparison of Means for Parenting and Self-Control Variables by Gender**

	Males		Females	
	Mean	Std. deviation	Mean	Std. deviation
Parental nurturance score *	11.48	3.22	11.82	3.10
Parental rejection score	20.95	5.57	21.30	5.55
Parental monitoring score ***	9.44	4.83	9.31	4.65
Self-control score ***	14.41	3.45	14.93	3.23

\*\*\*p < .001    \*\*p < .050    \*p < .100

Model 1 presents the OLS regression coefficients for self-control on the demographic variables. Consistent with previous research, results indicate that females report significantly higher levels of self-control than males ( $p < .01$ ). In addition, children whose PMK has a post-secondary degree or diploma report significantly higher levels of self-control than children whose PMK has not completed college or university ( $p < .05$ ). However, number of children in the household and socioeconomic status do not appear to impact self-reported self-control among children aged 10 to 15. Together, the variables in Model 1 explain five percent of the variation in self-control.

Model 2 adds the family type dummies to the regression equation. Results indicate that children in single parent households report significantly lower levels of self-control than children from intact families ( $p < .001$ ). There appears to be no significant difference in self-control between children from intact families and children from reconstituted families when controlling for sociodemographic characteristics. The effect of gender remains statistically significant ( $p < .01$ ); however, the association between PMK's education and self-control is no longer significant when controlling for family type, suggesting that the education effect in Model 1 is due to differences in education levels of single-parents relative to intact parent families. The addition of family type increased the amount of variance explained to ten percent.

The third Model introduces the three parenting variables, two of which are statistically significant and in the expected direction. Higher levels of parental nurturance predict higher self-control among children aged 10 to 15 ( $p < .001$ ), while higher parental rejection predicts lower self-control ( $p < .001$ ). Interestingly, parental monitoring does not have a statistically significant effect on the dependent variable. Gender remained significant ( $p < .01$ ); however its effect was somewhat weaker after intruding the parenting variables. As such, it can be concluded that parenting style (i.e., nurturance and rejection) partly explains the difference in self-control between males and females. Collectively, the variables in Model 3 account for 11.5 percent of the variance in self-control.

Six interaction effects were tested for Model 4. Interaction terms for gender and each of the parenting variables were included in the model (not shown), none of which were statistically significant. Thus, the effects of parental nurturance, rejection, and monitoring on self-control do not appear to vary depending on the gender of the respondent. Interaction terms for family type and the three parenting variables were also tested. Results indicated that the effects of parental nurturance and parental rejection do not vary significantly across family types (results not shown).

The interaction of parental monitoring and family type is statistically significant (see Model 4). The interaction coefficients represent the differences in the slope

of parental monitoring for children in single parent and reconstituted families relative to those in intact families. Results indicate that the association between parental monitoring and self-control is not statistically significant for children from intact families; however, among children from reconstituted and single parent households, the associations are positive and significant ( $p < .001$  and  $p < .05$ , respectively). Thus, higher monitoring is associated with higher self-control among children from reconstituted and single-parent families but not for those from intact families. Moreover, the slope for children from reconstituted families is stronger [ $b = 0.131$  (i.e.,  $-0.029 + 0.131$ )] than for those from single parent families [ $b = 0.78$  (i.e.,  $-0.029 + 0.078$ )], meaning that higher levels

of monitoring have a stronger impact on self-control for children living in reconstituted households.

In addition to the significant interaction, Model 4 reveals a second interesting finding. After introducing the interaction terms, the difference in self-control between intact and reconstituted families becomes large and significant ( $p < .01$ ). Further, the magnitude of difference in the dependent variable between intact and single-parent families nearly triples ( $p < .001$ ). When controlling for all other variables in the model, children from reconstituted families score, on average, 2.2 points lower on the self-control scale, and children from single-parent families score 1.69 point lower than children from intact families. It appears, then, that the stronger effect of monitoring

**Table 3. OLS Regression Coefficients of Self-Control on Demographic, Parent Status, and Parenting Variables**

		Model 1		Model 2		Model 3		Model 4	
		Estimate	Std. error	Estimate	Std. error	Estimate	Std. error	Estimate	Std. error
<b>Constant</b>		12.129		12.189		11.412		11.593	
<b>Gender</b>									
	Male	(ref)		(ref)		(ref)		(ref)	
	Female	0.311 **	0.100	0.301 **	0.100	0.255 **	0.095	0.252** **	0.095
<b>Number of children in the household</b>									
	1 child	(ref)		(ref)		(ref)		(ref)	
	2 children	-0.099	0.114	-0.071	0.114	-0.045	0.108	-0.075	0.108
	3 children	-0.023	0.154	-0.010	0.153	-0.018	0.145	-0.029	0.145
	4 or more children	0.086	0.216	0.146	0.216	0.272	0.205	0.265	0.205
<b>PMK's education</b>									
	High school	(ref)		(ref)		(ref)		(ref)	
	Less than high school	-0.085	0.161	-0.110	0.161	-0.026	0.152	-0.024	0.152
	Some postsecondary	0.176	0.150	0.124	0.151	0.107	0.142	0.118	0.143
	Secondary degree/diploma	0.336 *	0.165	0.301 *	0.165	0.200	0.157	0.210	0.156
	Socioeconomic status	0.029	0.093	-0.141	0.101	-0.154	0.096	-0.141	0.096
<b>Family type</b>									
	Intact parent family			(ref)		(ref)		(ref)	
	Stepparent family			0.134	0.192	0.128	0.182	-2.235 **	0.765
	Single parent family			-0.549 ***	0.130	-0.567 ***	0.123	-1.694 ***	0.495
<b>Parental nurturance</b>						0.095 ***	0.010	0.094 ***	0.010
<b>Parental rejection</b>						-0.145 ***	0.011	-0.146 ***	0.011
<b>Parental monitoring</b>						0.005	0.016	-0.029	0.019
<b>Stepparent* parental monitoring</b>								0.160 ***	0.050
<b>Single-parent* parental monitoring</b>								0.078 *	0.033
		N = 3,927		N = 3,927		N = 3,927		N = 3,927	
		R <sup>2</sup> = .005		R <sup>2</sup> = .010		R <sup>2</sup> = .115		R <sup>2</sup> = .118	
***p < .001    **p < .010    *p < .050									

for children belonging to single-parent and reconstituted families offsets differences in self-control across family types.

### **Discussion and Conclusions**

In sum, regression analyses reveal that adolescents who see one or both of their parents as rejecting, or more specifically, being inconsistent in applying discipline, nagging about little things, being physically abusive or using the threat of physical abuse, or, in general, negligent in their parenting responsibilities, tend to score lower on the self-control index than those who describe their parents as more consistent in their disciplinary practices. On the other hand, adolescents who perceive their parent(s) as being proud of them, and responding to them in a caring manner, are more likely to score higher on self-control than their counterparts. The effect of parental monitoring is more complex, given its interaction with family type. Among children from intact families, parental monitoring is not associated with self-control, while the association is positive for those in reconstituted and single parent households. Further to this, the positive association between parental monitoring and self-control is stronger for children in reconstituted households than for children in single parent families when controlling for various sociodemographic characteristics.

Reflecting on the general theory, this paper supports the relevance of effective parenting on children's level of self-control. Our first hypothesis – that factors representing effective parenting practices should have a significant and positive impact on children's self-control, while measures of ineffective parenting should be negatively correlated with self-control – was confirmed. However, one would expect parental monitoring to have a significant impact on self-control for children from intact families. Further, if parental affection precedes supervision, then the relationship between nurturance and self-control should be mediated by monitoring. Yet nurturance is a consistent predictor of self-control, regardless of the gender and family type of the respondent and despite controlling for parental monitoring.

Our second hypothesis – that levels of self-control should vary according to family type, with children from intact families demonstrating the highest degree of self-control, and children from single-parent and step-families having lower levels of self-control – was confirmed. ANOVA results indicated small but statistically significant differences in self-control that intensified after controlling for the family type/monitoring interactions in the fourth OLS regression model. Mean self-control

scores for children in reconstituted and intact families are similar, but slightly lower for those from single-parent families. However, these differences would undoubtedly be larger if parental monitoring did not have a differential impact on self-control across family types. After taking into account the interaction effect, self-control was highest among children from intact families, followed by those from single-parent families. Children from reconstituted families scored lowest on the self-control scale. Differences were both significant and substantial.

Our third hypothesis was that factors such as gender, family size, and socioeconomic status should have a negligible impact on self-control when controlling for parental effectiveness. However, contrary to this hypothesis, and the general theory, the effect of gender persisted after controlling for parental effectiveness. Moreover, number of children in the household, PMK's education, and socioeconomic status do not significantly impact self-control. Further, given what we believe are robust measures of parental monitoring, nurturing, and rejection, it is telling that the R-squared value is unimpressive at best. Thus, contrary to Gottfredson and Hirschi's assertion that the "major 'cause' of low self-control...appears to be ineffective child rearing," our findings suggest that child rearing practices alone are insufficient to explain low self-control (1990:97). Future research examining the predictors of low self-control must therefore take into account other factors in addition to parental behavior, such as peer influence, strain, and adverse neighbourhood conditions (see for example, Pratt et al., 2004; Rutter, et al. 1999a; 1999b).

Turning to the limitations of this study, we were fortunate to have a large, national sample; nevertheless, we also faced issues common to secondary data analysis. For example, with respect to measurement, it would have been ideal if our dependent variable had a broader range of indicators of self-control. However, as Tittle and his colleagues point out, there is currently no universally accepted measure of self-control. Thus, it is necessary that the contentions of the general theory be tested using various measurement instruments (2003:431). Also, when using cross-sectional data, causal inferences always pose a problem. For instance, in the present study, there may be reciprocal causation. That is, parental behavior influences child behaviour, which subsequently affects parental behavior, and so on. A child with low self-control may therefore experience inconsistent parenting as parents struggle to find a way to handle the child.

Despite the limitations noted above, we believe this exploratory study makes a contribution to the research on the general theory of crime and, more specifically, to the

sources of self-control. Although much of the variance in self-control remains unexplained, the family dynamics of intact households seem to have a positive affect. What is most important in this analysis, we believe, is the recognition that parental supervision has the potential to counteract the risks associated with growing up in reconstituted and single-parent households and, regardless of family structure, a nurturing, non-rejecting family environment is positively associated with children's self-control.

## Endnotes

1. The parental nurturance, rejection, monitoring, and self-control variables (discussed below) are available for public use only at wave 3, while many of the demographic variables are available only at wave 1.

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Appendix A. Scale Items

**Parental Nurturance**

My parents smile at me  
My parents praise me  
My parents make sure I know I'm appreciated  
My parents speak of good things I do  
My parents seem proud of the things I do

**Parental Rejection/Negligence**

My parents forget a rule they have made  
My parents let me go out any evening  
My parents nag me about little things  
My parents keep a rule when it suits them  
My parents threaten to punish more than they do  
My parents enforce rules depending on their mood  
My parents hit me or threaten to do so

**Parental Monitoring**

My parents want to know what I'm doing  
My parents tell me what time to be home  
My parents tell me what TV I can watch  
My parents make sure I do my homework  
My parents find out about my misbehavior

**Self-Control**

I can't sit still, am restless, or hyperactive  
I am distractible, I have trouble sticking to any activity  
I fidget  
I can't concentrate, can't pay attention for long  
I am impulsive, act without thinking  
I have difficulty awaiting my turn in games or groups  
I cannot settle anything for more than a few moments  
I am inattentive

**Source:** *National Longitudinal Survey of Children and Youth (1997)*