

Transdisciplinary Research Perspective: Epidemiological Criminology as an Emerging Theoretical Framework for Substance Abuse Research

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2.1 Transdisciplinary Thinking: Going Down the Rabbit Hole

In the polemic prose of Lewis Carroll's "Alice in Wonderland," Alice ventures down the rabbit hole, fraught with unknown peril, a chilling reminder that what we once knew or believed, can come to a screeching halt, drastically and dramatically, changing the very essence of our thoughts, thereby altering our once coveted place in the sciences. As scientists, generally, our space and place is a narrow world that should sit on the precipice, the edge of embracing new thoughts and new approaches in examining substance abuse research. Yet, our once strongly held world view can, at times, become more of an illusion, and come tumbling down, when mixed with other realities, processes, thoughts, methods, sciences, and perspectives; a tapestry of complexity. Such is the case when we go down the rabbit hole of science to eventually find

that we must challenge, at times alone, the ethos of scientific traditionalism and silo thinking. Many of our brethren in substance abuse research fears charting new territory, new byways and pathways to discovery, new challenges that can lead to an amalgamation of transdisciplinary thoughts, ideas, and emerging methods and theories. This unfortunate reality avoids venturing out into the light of day for new and innovative scientific ideas.

In this chapter, we will argue that we must embrace a polymorphism of transdisciplinary thinking to better undertake the changing nature of substance abuse research, transcending both the researcher themselves and the training they are provided. We are oftentimes reminded that our staunch view of the world as discipline-specific scientists has conditioned us to examine the world with a narrowly refined lens, as though we are looking at a petri dish, where boundaries are clear, and depth is at a cellular level. Yet, we are, at this space and time of substance abuse research, encountering a new era, a new renaissance, where enlightenment reigns supreme, and a single perspective or discipline might do more harm than good.

In this case, substance use and misuse fits the paradigm of both a public health and criminal justice problem. Substance abuse and dependency costs taxpayers more than \$534 billion in the United States each year (NIDA 2007), while drug use, possession, and distribution results in the incarceration of 14–19% of the total prison population, including both federal and state inmates, respectively (Mumola and Karberg 2006).

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However, when we examine how to address a transdisciplinary problem, such as substance abuse, conceptually and methodologically, we need to become aware of the unique distinctions between public health and criminal justice systems organizationally, theoretically, and methodologically. For example, although public health officials emphasize prevention of drug abuse and dependence, the need to consider redirecting existing or future prevention resources to better take into account a symbiotic relationship between public health and criminal justice may be more scientifically, fiscally, and logistically reasonable and efficacious. While some could argue that the criminal justice system is 'retributively-oriented' because of high drug-related recidivism rates, it should also be noted that their primary mission and role has been to prevent harm (through enforcement and sanctioning) employing various forms of prevention punishment for violating drug laws. The same argument can be directed to public health systems, particularly, in situations when protecting the public's health might outweigh the perceived benign nature of public health and its impact on substance abuse prevention (Akers et al. 2013). In other words, the current state of disjunction between the public health and criminal justice system results in a surplus of untreated adolescent and adult repeat offenders who may be amenable to rehabilitative treatment that shares in the resources and expertise of both systems of prevention and enforcement.

2.2 Rethinking Health and Crime in Substance Abuse Research

Substance abuse research, a subject fraught with diverse perspectives and discipline-specific peril, has been studied from many disciplinary perspectives, ranging from psychology to economics, each with their own seemingly unique and unyielding insight. While commendable, each discipline brings its brand of science, modus operandi, and few models that are transdisciplinary enough to breakdown the scientific walls of isolationism. The same can be said for the

science and practice of public health and criminal justice. Take public health, for example. Public health researchers have been employing a plethora of interventions and treatment, evaluating policies, and assessing the etiology of substance abuse for decades. At the same time, criminal justice researchers have created and evaluated drug courts, treatment programs in correctional settings, and policing tactics intended to reduce drug abuse and dependence. For decades, criminal justice practitioners and scholars have even approached primary, secondary, and tertiary prevention strategies for youth to try and change risky behavior before, during, and after it can take deep root and start to cultivate a growing milieu of at-risk behavior (Brantingham and Faust 1976). Despite the clear overlap in the public health and criminological research agendas, research methods, and itinerant theories, there has been little discussion between researchers in these two disciplines (Akers and Lanier 2009). Unfortunately, transdisciplinary communication in drug abuse research has virtually gone almost unnoticed, and certainly has not been rewarded or encouraged. In fact, scientific colleagues and senior administrators in higher education who are wedded to perpetuating their discipline-specific brand of theory have, either unintentionally or intentionally, discouraged this cooperation between disciplines. Invariably, when you look at a scientific article and the disciplines of each author, they tend to be the same: psychologists publish with psychologists, sociologists with sociologists, and public health scholars with public health scholars; this point becomes clear.

However, when we examine substance abuse and the potential myriad of transdisciplinary theories and methods that can be conceptualized, developed, and integrated, it becomes an excellent research domain for scholars and practitioners of criminal justice and public health to stretch the methodological limits to understand drug use behavior (Potter and Rosky 2013). For example, irrespective of whichever substance abuse methods are employed, despite having clear physiological health effects (for a review, see Boles and Miotto 2003), the use of some

drugs is societally condoned (e.g., alcohol, tobacco, and, in many cases, marijuana), while others are deemed illicit and societally unacceptable. As a result, a unique dichotomy emerges whereby problematic use of licit, legal substances is rectified via treatment services, while problematic use of illicit, illegal substances is often punishable through jail time or other retributive and punitive measures.

This social construction of the harm, or, more accurately, the physiological risk associated with each type of substance is particularly interesting in that some illicit drugs have been touted as being less harmful than alcohol or tobacco (Macleod et al. 2004). For instance, alcohol and tobacco have clear negative health effects that have been long established in the scientific literature, including multiple types of cancer and organ damage. Marijuana, on the other hand, has been linked with minor respiratory disorders, but few long-term poor health outcomes (NIDA 2007). However, the natural experiments in decriminalization of marijuana, legalization, and healthcare record uniformity, which are currently occurring in the United States, provide an optimal research environment for scientists to learn about the long-term outcomes of marijuana use in comparison to alcohol and tobacco. In addition, some illicit use is condoned in some jurisdictions (for instance, marijuana has been decriminalized for medical usage in the State of California, but remains a Schedule 1 drug federally in the United States). Therefore, given the contradictory legislation of the current date (2014), the study of marijuana is an especially complex methodological process.

To provide further detail on the complexity associated with the study of illicit (or in some states, decriminalized or legalized) substances, Colorado (among other states) has recently legalized the open and legal use, sale, distribution, and manufacturing of marijuana. Therefore, in the state of Colorado, marijuana is no longer being designated as a controlled substance. Over time, data on substances, such as marijuana, will inevitably become more available through new

venues of reporting and data collection methods for clinical outcomes about marijuana's effects and other health outcomes, simply because it will now be more freely and legally reported to healthcare providers and law enforcement. In other words, given that research on drug use and abuse is particularly complex in light of the social environment and new policy changes surrounding drug use in the United States, the states that are opting to legalize or decriminalize formerly illicit substances (such as marijuana) will, for better or worse, lead to a richer and more robust storehouse of surveillance data. In theory, substance abuse researchers will, ideally, transcend disciplinary boundaries due to the freely available, medically verifiable outcome data (for instance, health records, tax information, sales and quantity distributed, and police/legal data) beyond the traditional self-reported information that is used today. And, as the distinction between drugs as pharmaceuticals and drugs as criminal behavior become increasingly blurred, the need for integrated surveillance systems and protocols for substance abuse research will become even more paramount (Akers 2013).

2.2.1 Language and Lexicon: Finding a Common Ground

Language, that primordial stew of letters, words, numbers, characters, or gestures, pours out its messages and meanings across countless dialects, mathematics, and scientific terminology. Substance abuse research is no different. Across endless ocean of terms used to convey scientific meaning, substance abuse researchers bring forth their own unique brand, discipline, and blending of terms; because what is a science if it was not for its own terminology? The world of substance abuse research calls forth many terms. The sheer complexity is reflected in the disparity in terminology that masks a distinction between the terms 'substance abuse' and 'drug abuse.' Take a moment to consider how seemingly similar terms grew and replaced other terms for decades. The

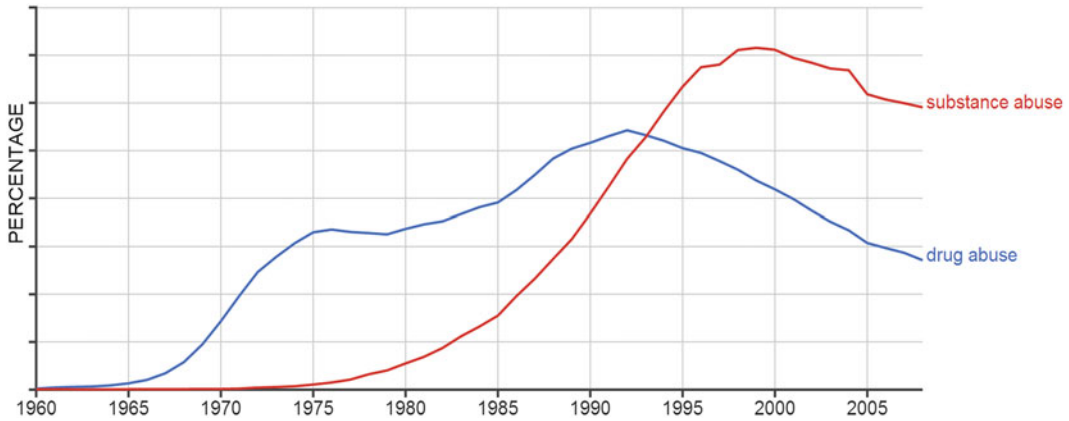


Fig. 2.1 Substance abuse and drug abuse Google Ngram terms used from 1960 to 2008

‘Google Ngram’ provides a visual image of word usage in books over the decades (see <https://books.google.com/ngrams>). This sophisticated program extricates words used in tens of millions of books authored in English over the generations and provides a graphic depiction of a terms usage over time and percent, though the percent indication is not relevant as compared to the portrayal of the longitudinal image.

To illustrate our point, we chose the description of ‘substance abuse’ and ‘drug abuse’ and juxtaposed these similar terms over the decades. Figure 2.1 illustrates the ebb and flow in the use of the terms, which have changed over the decades, thereby, possibly, altering our scientific outlooks as to how best to synthesize or use these terms across different disciplines, or even how possibly to tailor, design, or weave new interventions. While this distinction can most certainly encompass volumes of scholarly words, ours is not to debate this point, but rather, to illustrate how language, descriptions and designations can change the very fabric of our weave. One may think this is an innocuous distinction, but we appreciate a quip made by the late George Orwell in his famous 1984, where he scripts that “*But if thought corrupts language, language can also corrupt thought.*” From our perspective, transdisciplinary thinking might serve to avoid corrupting both language and thought.

2.3 Drug Users (a Challenging Group to Research): Defining a Research Protocol

Over the course of three decades (1970–2006), drug abuse has soared 354.7%, from 415,600 to 1,889,810 cases, respectively, in the United States (Benson 2009; U.S. Bureau of Justice Statistics 2011). Identifying drug users, as mentioned above, presents a unique problem for drug abuse research. Who are drug ‘users,’ ‘misusers,’ and ‘abusers’? Is using marijuana once a month ‘misuse’? At what point does ‘misuse’ become ‘abuse’? Public health and criminal justice researchers approach all of these questions differently as a function of the highly specific research training they received. For example, “in 2010, an estimated 22.1 million persons (8.7% of the population aged 12 or older) were classified with substance dependence or abuse in the past year based on criteria specified in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV-TR). Of these, 2.9 million were classified with dependence or abuse of both alcohol and illicit drugs, 4.2 million had dependence or abuse of illicit drugs but not alcohol, and 15.0 million had dependence or abuse of alcohol but not illicit drugs” (CBHSQ/SAMHSA 2013).

In this example, the American Psychological Association (2013) clearly defines substance use disorders in terms of 11 specific criteria: (1) taking larger amounts of the substance than originally intended; (2) wanting to cut down on use but unable to do so; (3) drug seeking; (4) recurrent legal problems; (5) unable to conduct routine activities at home, work, or school due to drug use; (6) continued use despite problems associated with the substance; (7) giving up recreational activities as a result of drug use; (8) continued use despite harms; (9) tolerance; (10) withdrawal; and (11) continued use despite physical or psychological problems associated with drug use. The number of criteria met was then categorized into 'abuse' or 'dependence' to classify each individual. These criteria were developed to broadly apply across all types of drugs, from alcohol to methamphetamines. The status of licit versus illicit was not a factor in terms of the diagnosis.

As further evidence of intra-disciplinary complexity in measuring drug use, in 2014, with the release of the DSM-V, the APA itself has modified how substance use is classified (removing legal problems and adding 'strong desire or urge to use a substance' as an indicator of substance use disorders). The more criteria met for a diagnosis, the more severe the disorder, and the terms 'abuse' and 'dependence' are no longer used to refer to any substance. Instead, all criteria are weighted equally on a continuum, and any person who indicates 2 or 3 of the 11 criteria are considered to have a 'mild substance use disorder,' those who report 4 or 5 have a 'moderate disorder,' and those with 6 or more of the 11 criteria are categorized as having a 'severe substance use disorder' (Grohol 2013). Although there are pros and cons associated with each variety of measurement, the APA provides an interesting example of how the definitions and categorizations of substance use, abuse and dependence change within one discipline over a very short amount of time.

None of these APA definitions are exhaustive; in fact, a large proportion of the literature on substance abuse does not operationalize drug abuse using these definitions. For instance, a

great deal of substance abuse research in criminal justice and criminology uses official reports derived from police records. In this case, drug use will likely be defined in terms of a drug-related arrest (possession of drugs and/or paraphernalia, possession with the intent to distribute). Conversely, some public health studies have used emergency rooms as venues to recruit substance abusers that present for treatment of an overdose, violence, or drug-related accident. In effect, these sampling methods identify some of the most at-risk substance users; however, these individuals do not necessarily meet the definition used by the APA. That is, the cases may or may not be drug abusers per se; instead, they may be occasional users or involved in distribution of illicit substances, thereby leading to what we might coin as a methodological or conceptual 'discordance.' That is, as disciplinary lines become blurred (as you can clearly see in the example above), research methods begin to overlap.

As methods continue to overlap, substance abuse researchers will further cross over and morphous into other realms of science, and a new enlightenment, a new renaissance for the science of substance abuse research will emerge. Although we are not promoting one discipline, method of sampling, or even one theory or practice over another, we are directly, encouraging researchers to reassess their target populations. This in-depth thinking to determine the most valid scientific method, rather than the most convenient one, will help determine which method of selection, sampling, measurement, theoretical modeling, and analysis is most appropriate given their research question. In many cases, the optimal sample, or the methodological discordance, may require more transdisciplinary thinking about the most meaningful definition of substance use, abuse, and dependence, is of utmost importance for each specific study. Although quantity of research produced is often rewarded over quality of science and the impact of a publication on practice, we urge those who have the power to encourage *critical thinking* in their operationalization of substance use, abuse, and dependence in their departments

and research circles. We recognize that this thinking is far more time consuming than simply using what has been used in ‘previous research,’ the potential for progress is tremendous if this type of culture can be developed.

2.4 Methods at the Intersection of Epidemiology and Criminology

Tapping into the collective wisdom of transdisciplinary thought takes some creative thinking. One does not simply claim to be a winner when a race is only creeping along. Beyond these metaphors, we recognize that substance abuse researchers, first and foremost, are a tapestry of diversity with respect to their disciplinary lineages, thought patterns, and many diverse (or similar) approaches used to study substance abuse. Their training may range from biology to social work and any and every discipline in between. Yet, there tends to be a plethora of methods used to study substance abuse, and these methods are not rooted in any one discipline; though, arguably, they tend to employ more epidemiological measures with respect to their reporting of health impact, pathology, disease transmission, morbidity and mortality outcomes.

Historically, at the intersection between epidemiology and criminology lays similarity in common methods used. For example, criminological research was, for many years, predominantly cross-sectional in nature, providing only a single snapshot of criminal and deviant behavior. In the early 1990s, criminologists heatedly debated the value of longitudinal designs in their research. Eventually, a consensus emerged that longitudinal research designs were superior to cross-sectional designs, in that the findings were more valid and replicable (Menard and Elliott 1990). Books were published re-testing theories, such as developmental life-course theories of adolescent behavior, with longitudinal data as its scientific grounding and method of choice (Lieberman 2008). In support of this approach, the field of criminal justice has embraced the notion that longitudinal data are valuable sources of

information, despite the tremendous cost, labor, and time associated with data collection.

Through the evolution of greater transdisciplinary thinking, longitudinal designs in epidemiology and criminology have allowed both disciplines to expand into new directions and embrace new horizons, while, at the same time, working more closely together, and sharing theories, methods, and hypotheses (Akers et al. 2013). In criminology, longitudinal data have been used to describe intra-individual trends in arrests and drug use over time. Similarly, social epidemiologists used longitudinal data to study the long-term effects of poverty, sugar-sweetened beverages, or limited access to healthy foods (Drewnowski and Specter 2004; Kendzor et al. 2012). These problems could not be studied with cross-sectional data, as the single time point of data collection limits a researchers’ ability to evaluate change over time. Longitudinal data are especially appropriate in both epidemiology and criminology, as behavior (particularly substance use behavior) changes measurably over time.

As we continue to keep focused on substance abuse and its many complexities from a research methods perspective, we note that cross-sectional and longitudinal designs are not the only research designs used to study substance abuse problems, although they are the most common. Case-control studies are often employed in epidemiological studies, particularly, in the case of rare outcomes (e.g., anthrax poisoning or Hepatitis C). These designs are also useful in time-sensitive situations, such as outbreak investigations used in epidemiology to detect and control the source of an infection (for instance salmonella or listeria in a hospital). Briefly, a researcher would identify targeted cases (those who have listeria) and compare to a series of similar, but non-diseased (often matched) controls. Once the sample has been identified, the researcher will look backwards in time to identify which risk factors (or protective factors) differentiate the cases and controls. In other words, *which variables increase the risk of disease?* We would find that those patients with listeria were operated on in the same operating room and the surgical tools were not cleaned properly. This

will help us in preventing future cases of listeria. In substance abuse research, we might consider case-control studies as ‘mining the discipline.’ That is, we can pick away at all the factors, all the minutia, that might have contributed to a person or event being subjected to a known or unknown risk. In other words, we can look at all kinds of variables that might increase or decrease the risk of abusing substances from multiple disciplines, including neurology, sociology, demography, epidemiology, and criminology, among many others. It is critical to note that a case-control method transcends disciplinary boundaries, but may not necessarily use the same lexicon, as described in a criminology or criminal justice methods book or encyclopedia (Piquero and Piquero 2002). No discipline can hold claim to this method *per se*. Although these research designs have been pervasive in medicine and public health, they are just now being used to assess drug use and crime. In fact, most of the criminal justice research using case-control designs is published in transdisciplinary journals across the fields of criminal justice, public health, psychiatry, and medicine (Needleman et al. 2002; Reingle et al. 2013). Once transdisciplinary communication increases, these types of designs will be particularly useful in identifying factors that developmentally contribute to initiation, continuity, and desistance from various substances.

2.5 Rethinking Our Way of Thinking for Substance Abuse Research

The design of studies in criminal justice and public health is not the only thing that has been changing over time. New analytical methods have paved the way for hierarchical analysis that can occur at the ecological level (macro), meso, exo, and micro-level (Akers et al. 2013; Trickett and Beehler 2013; Akers and Lanier 2009). These methods allow for new ways of thinking about old problems, as each layer (e.g., ourselves, our family, our friends, our community, and our society, for instance) has an effect on our

behavior, and we have an effect on theirs. For example, the ‘micro’ level unit of analysis includes characteristics of the individual, including the home environment, religious institutions, and the workplace. In the micro-environment, people interact directly with their environment. The meso-environment connects micro-environments, or interactions between people (e.g., teachers and parents, child and parents, etc.), and the exo-environment has no direct (only indirect) influences on the individual (including communities or neighborhoods to which a person belongs). And the ‘macro’ unit of analysis refers to the environment in which we live, work, and play, such as the culture of the United States, or our particular state of residence. Changes in policy, such as the Affordable Care Act or federal sentencing guidelines, occur at the macro level.

These various layers, dimensions, or units of analyses can serve as sort of ecological links in a chain that helps to frame transdisciplinary thinking. Take, for instance, impaired driving as a concrete example of how ecological information is used in an epidemiologic and criminological study. Impaired driving (or driving under the influence of alcohol) is a problem that spans both the public health and criminal justice research agendas. In other words, impaired driving has often been treated at the individual (micro) level by criminologists using police arrest reports. Recently, epidemiologists have employed ‘big data’ (macro-level, integrated database systems) on motor vehicle crashes and fatal accident reports to assess the influence of alcohol-related policies on impaired driving. Integrative analytic methods now allow researchers to determine if the launch of a new policy has any effect on deaths or injury as a result from impaired driving. Interrupted time-series analysis is one such technique that can help to understand micro-, meso-, or exo-system level events over time to determine if there was a spike across public health communication or criminal justice enforcement type of macro-level policies. This method will be especially appropriate to evaluate changes in health outcomes as marijuana legalization policies change over time.

In summary, transdisciplinary thinking about driving under the influence of alcohol has now resulted in several policy changes (e.g., bartender training, driver's license suspension programs, and mandatory jail sentences) that have the potential to reduce the number of accidents and deaths attributable to impaired driving. To address the exo- and meso- layers, many substance abuse prevention and intervention programs now include families, peers, and teachers. It is clear that rehabilitation cannot be successful in a vacuum, as people will return to their daily lives and, without grounding in the proper skills set, will revert to continuing to use alcohol or drugs.

The vast majority of research today occurs at the micro-level, collecting survey data (or crime records or hospital data), on each individual person. The unit of analysis is the patient (or offender). As a result of these micro-level designs, the implications of this research apply to individuals. The same example can be applied to an HIV/AIDS positive person who intentionally infects sex partners without their knowledge, or intentionally shares their contaminated injection drug works to unsuspecting prey. Yet, from a transdisciplinary perspective, we must increasingly consider how our analyses and units of analyses overlap or intersect in order to enrich our analytical thinking in the area of substance abuse research. As noted above, a transformation in thinking about our unit of analysis, one that transcends disciplinary boundaries, to take into account all levels, such as the macro-level that has the potential to create far more change (via public policy), as the results of a well-designed macro-level transdisciplinary study could be generalized to the entire country. Policy evaluations conducted at the exo- or macro-levels have the potential to decrease risk behavior (e.g., impaired driving), or increase positive behavior (e.g., use clean needles, wearing of condoms, or undergoing routine drug screening), for everyone in the macro environment. These types of designs that apply to large portions of the population are likely to have the greatest impact on the public health, or substance abuse research.

2.6 Challenges in Conducting Transdisciplinary Research on Substance Abuse

2.6.1 Traditionalism Versus Enlightenment

Apart from what has already been shared, as substance abuse scientists, practitioners, policy-makers, or clinicians, we share a kind of cognitive dissonance, a 'love-hate' relationship battling inside our colleagues and ourselves when it comes to embracing or letting go of traditionalism versus enlightenment. On the one hand, it is difficult to let go of preordained methods, approaches, techniques, and models that we were trained in extensively and have used for decades; while, at the same time, trying to embrace a new era of enlightenment, where greater numbers of diverse disciplines are drawing from the science and experience of others. To address these issues, we feel it is necessary to take baby steps to share what has led us to strongly embrace a merger of epidemiologic and criminogenic integration within the context of substance abuse research.

To begin with, it is important to note that we are not simply suggesting that we replace one discipline for another, or to go down one rabbit hole rather than the other. Quite to the contrary, what we are suggesting is that we as researchers consider the possibility of integrating disciplines; particularly, epidemiology and criminology, which may serve as a channel to bring forth new and innovative trans-disciplinary thinking, while holding on to the rich experience and history of other disciplinary streams of consciousness, training, experience, and insight. Take, for example, psychology, sociology, social work, criminology, and epidemiology (among others). Each of these disciplines coronets a majesty and tapestry of expertise and diversity of thought. Yet, each also brings with it, for better or worse, a myopic disciplinary way of thinking; a one size fits all sort of mindset. That is, psychologists will look at the individual; sociologists will examine the group; social workers the

case services; epidemiologists the data; and criminologists, the aberrancy of the individual and group dynamics. Clearly, given the complexity of the substance use as a societal problem, all of these disciplines has a unique insight to contribute that may serve to help us learn and by extension, prevent and reduce the costly burden of substance use and abuse in the United States.

2.6.2 Bias While Tiptoeing Through the Tulips (Sample Selection and Reporting of Drug Use)

All disciplines, regardless of heritage or legacy, seek to understand the challenges in conducting substance abuse research from their single disciplinary perspective. Through our myopic lenses, we draw conclusions, make assumptions, and report findings (Whoriskey 2012). We are, for all intents and purposes, biasing our research, biasing our samples, and biasing our findings, when we neglect to take into account unique and diverse perspective on a singular problem. This does not mean that researchers *must* accept alternative views; however, we are asserting that substance abuse researchers simply consider the arguments and potential alignments from disciplines other than their own. An appropriate analogy might be how one views their own children, as sometimes our judgment is clouded because we are so close to the subject (in this case, our children) that our own perceptions distort our objectivity or our ability to view the behavior of our children from a single person's perspective.

From the lowly researcher to a vast research group, the world and science of substance abuse research is plagued by bias, innuendo, and silo mentality and methodology. While such a statement will, most certainly, create controversy and most likely invoke animus, the intent is, first and foremost, to stimulate debate and dialogue. Attacking research biases requires discussion and collaboration across disciplinary domains. However, a research cohort that has or only embraces

scientists trained in the same discipline is not a science any longer; rather, it is an advocacy group. Such is the need to call for new perspectives, by identifying where disciplines share a common core, a common language, and a common understanding, but are different and unique nonetheless.

2.6.3 Case Study: The Evolution of Epidemiological Criminology

To avoid extinction or prey, species throughout the world have had to constantly adapt to their environments. From the deepest recesses of the oceans to the highest mountain peaks, the animal kingdom has learned to accept change as a normal course of their evolution, to find a middle ground that provides the greatest amount of opportunity. Not unlike the evolution of species, the scientific community has learned to embrace its subject of study, in this case 'substance abuse' by encouraging a vast array of disciplines to bring their plethora of theories, concepts, methods, and practices to the science of substance abuse research. Yet, rarely does a new discipline evolve to transcend a diversity of scientific domains while, at the same time, embracing the richness unique to each discipline.

In the recent past, a breakthrough in transdisciplinary thinking has emerged in the development of the *Epidemiological Criminology* paradigm (Akers et al. 2013; Akers and Lanier 2009). As you may have gathered from reading this article, the research agendas (particularly in regards to substance abuse) in criminal justice, criminology, public health, and epidemiology are largely complementary and overlapping. This integrationist trend towards a transdisciplinary ethos has been evidenced by the U.S. Centers for Disease Control and Prevention, the National Institute of Justice, and the National Institutes of Health proclamation that violence has now been identified as a public health imperative and national priority research area. Specifically, since the latter decade of the 1980s and continuing to the early 1990s, the world of public health has

targeted new prey (e.g., violence and violence-related injury prevention) in their quest to encourage transdisciplinary research. Arguably, this awareness may have been driven by a number of U.S. surgeon generals who publicly proclaimed violence as a public health imperative (Satcher 1995; Sullivan 1991; Koop 1989).

Crime and violence, as well as substance abuse, have been studied across a plethora of disciplines, including nursing and occupational safety (workplace violence and impairment on the job), environmental safety (design of safe neighborhoods, disposal of drug injection equipment), and public health (prevention of violence and drug use) (Krug et al. 2002). However, within the context of crime, violence, and substance abuse research, the fields of criminology and criminal justice have long served as primary disciplines in addressing these areas, having their anchor origins in the science of sociology. Yet, both public health and criminal justice researchers continue to travel down parallel pathways in their shared quest to reduce and understand drug use, crime, and violence, while continuing to hold steadfast to their uniquely rich disciplines.

For instance, public health officials and researchers are consistently emphasizing the need for primary prevention of violence, drug use, and other risk behavior. That is, although primary prevention (or eliminating the onset of drug use or violent acts) is addressed in criminal justice research, it can be more challenging to implement these prevention programs due to the reactive nature of the criminal justice setting (whomever encounters the criminal justice system, by definition, are no longer a candidate for primary prevention, as they have already initiated drug use and/or crime and have made contact with the police). To illustrate further, the police are the first point of contact when someone enters the criminal justice system. By the time a person comes in contact with the police, it is typically because drug use (or any other criminal behavior) has already initiated.

It is not impossible to conduct primary prevention of crime or drug use using a criminological framework, as innovative criminal justice

programming has integrated school-based primary prevention of drug use and violent crime (Webster-Stratton and Taylor 2001). However, these types of researchers are forced to transcend disciplinary boundaries to conduct this research. In addition, policing scholars are pushing to develop models of policing that will *prevent or reduce* crime, drug use, and violence (sometimes referred to as targeting the 'root causes,' such as through programs as McGruff the crime dog, or scared straight programs); however, the reactive nature of the policing institution still tend to present a challenge in the success of these efforts. Public health researchers, on the other hand, are often implementing prevention programs in schools and in community settings though they, at times, are developing and implementing interventions with little or no evidence to support their strategy. These two groups aim to achieve the same goal, drug use and crime prevention, but through different means. Part of the challenge of transdisciplinary substance abuse research is to identify a common thread whereby various disciplines can espouse expertise.

The *Epidemiological Criminology* paradigm recognizes that for a crime or delinquent act to have been committed, a statute or ordinance must have been violated. If no statute was violated in any way, no crime has occurred (Akers et al. 2013, Potter and Akers 2013). The operationalization (or definition) of 'legal' also varies over time. In Colorado, for example, the state has recently legalized the sale, distribution, and manufacturing of marijuana. What was once a crime in the state statute, such as the possession, sale, and distribution of marijuana, is no longer illegal. Hence, criminal justice interventions of interdiction or prevention may no longer apply. Whereas, on the other hand, public health interventions may continue to apply even more so, as in the case of adapting a similar approach to using a smoking cessation program or clean needle campaigns, especially from a transdisciplinary perspective for substance abuse research scientists (Nash et al. 2003).

The second level of prevention beyond primary is known as *secondary* prevention, or sometimes referred to as opportunity reduction or

risk reduction. This second tier intervention targets those who have already developed risk factors for the condition (for instance, an adolescent starts associating with a group of friends who use drugs, a clear risk factor for drug use), but the condition is not yet apparent in the individual (e.g., the individual does not use drugs themselves yet). To provide another example, the target audience for secondary prevention may be new smokers, or those who are surrounded by peers who use illegal drugs in an after-school program. These programs are more expensive than primary prevention, and are generally less successful once a risk behavior has been initiated. In this case, public health officials would seek to enroll at-risk candidates into treatment programs to reduce or discourage smoking and drug use, while police would identify these individuals (who may not be abusing or dependent upon substances) and seek incarceration, probation, or community service as a punishment intervention. However, given the especially high rates of recidivism among those released from penal incarceration, several criminal justice agencies are attempting new methods for reducing the number of offenders incarcerated (a New York State report found that a pilot test of drug treatment in lieu of incarceration was met with great ‘success’ and should be rolled out full-scale) (New York State Commission on Drugs and the Courts 2000). These approaches broaden tertiary prevention, whereby the perpetrator of an act has already carried out the violation (e.g., a person has used drugs), this approach is attempting to intervene before the person is incarcerated or subject to other legal and social ramifications. For example, more recently, drug courts and probationary treatment programs have emerged in the judicial system to encourage treatment for drug users and rehabilitation rather than incarceration. Although this type of thinking has been historically deemed ‘political suicide,’ taxpayers have become more invested in the idea of early intervention and treatment rather than dealing with the high costs of incarceration for decades.

Finally, tertiary prevention is a final stage attempt to treat a problem; in our case, substance abuse or dependence. This stage is the most expensive; as treatment must be intensive once physiological dependence has occurred. In many cases, individuals who self-identify as having a drug abuse problem will enroll in in-patient treatment. This stage focuses on the prevention of this behavior from spreading to or contaminating others, resulting in their substance abuse. Tertiary prevention is where containment occurs. From a transdisciplinary perspective, the paradigm of epidemiological criminology sets forth a unique framework that can help guide in the (re) design of a substance abuse research model that captures the most salient concepts and behaviors. For example, the criminal justice system, by and large, deals with drug dependent persons in the same way they deal with occasional users. The justice system, largely due to logistical complications, provides little differentiation of offenders (with the exception of inmate segregation to protect other inmates from especially violent individuals). However, if a particular court system is innovative, an offender may be assigned to a drug court or treatment program in lieu of incarceration (Hepburn 2005). This is where a tipping point between healthy and criminal behavior can sway an analysis from only one disciplinary perspective. Unfortunately, incapacitation does not address the root of the problem (the drug abuse), which frequently results in drug recidivism in comparison to drug courts or treatment-oriented sentences (Wilson et al. 2006).

2.6.4 Healthy Behavior or Criminal Behavior: Identifying a Tipping Point

Figure 2.2 depicts the *Epidemiological Criminology* model, which can help to conceptually frame a transdisciplinary approach to substance abuse research (see Akers et al. 2013). Theoretically and practically, a substance abuse researcher, regardless of their area of training,

should try and determine whether the substance abuse behavior tips more towards healthy (and experimental in nature) or criminal (see Fig. 2.2). This perspective provides the transdisciplinary researcher with a decision, a tool, on how best to begin their analysis. Built within the model are four determinants to help identify the myriad of life-course events that can tip behavior, thus activating the bio-psycho-socio- and environmental igniters that might have served as the catalyst to spark an aberrant and disparate trend of behavior. These factors can help in determining whether a criminal or deviant behavior is being, or has been, influenced by either internal or external, behavioral or biomedical disparities, that cultivate and nurture criminogenic outcomes. Early on in this chapter, we discussed briefly the differences between micro-, meso-, and macro-level analysis of behavior and environment. Each of these levels of influence, as well as the extent of their influence, should be considered. For instance, it is important to gather information as whether the drug use behavior is influenced by the individual themselves, their peers or associates, or encouraged by policies or the larger community in which an individual resides. For example, a change in policy can criminalize or decriminalize substance abuse violation (e.g., consider Colorado, as an illustration). Only time will tell whether the legalization of marijuana in Colorado will escalate the number of users who go into treatment or experience some facet of the public health or criminal justice system as criminally labeled substance abusers. To summarize, what is often viewed as enforcement by the criminal justice system, may also be enforcement from a public health perspective.

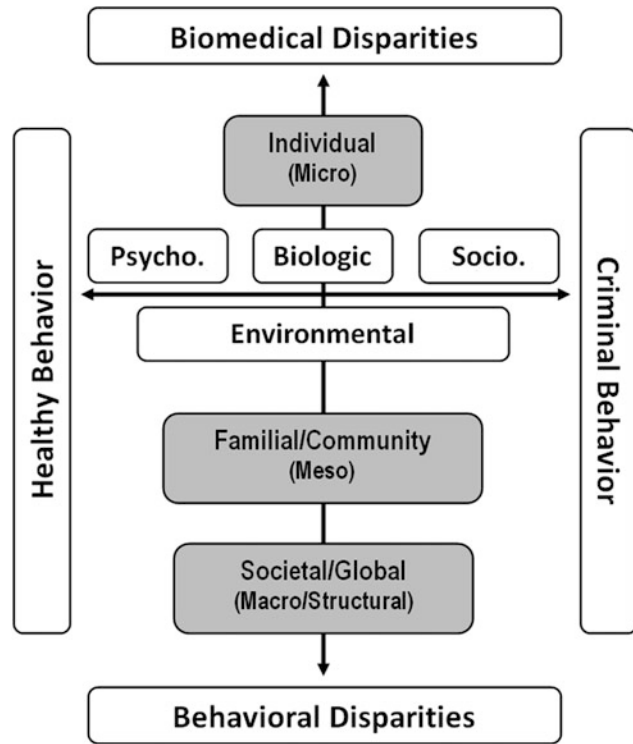
2.7 Summary

As we conclude with this transdisciplinary analysis for assessing new and emerging perspectives in substance abuse research methods, the introduction and evolution of *epidemiological criminology* as an innovative, transdisciplinary science has helped to enhance our understanding and express our need for scientific inclusion and

scientific innovation. The idea that all social behavior, be it healthy or criminogenic, is intertwined and interwoven across disciplines is nothing new per se. To prevent or dissuade aberrant or substance abuse behavior, some theorists might argue that to cultivate and implant a healthy behavior and lifestyle a community should increase the amount of street lighting in a neighborhood thereby making a target less 'suitable' for transient behavior ripe for keeping substance abuse (*or substance abuse research enlightenment*) in the shadows, both literally and figuratively. Others disciplines and theories may also call for primary preventive measures which might include such street activities as instituting community watch, or have community meetings to strengthen bonds and social capital within the neighborhood. Although both of these options, practices, or theories might play a role in crime or substance abuse reduction within a community, these interventions may also have unintended, albeit positive, effects and outcomes, such as increased walking in the neighborhood (more physical activity) and social events, thereby creating a healthy mind, body, spirit and community.

The inverse, on the other hand, may play into the subconscious stressors associated with living in a previously disorganized neighborhood that is in the early stages of recovery. When the pendulum of power swings between healthy or criminal in which it meets that tipping point threshold at either end, having chosen a wrong intervention or theory can drastically alter behavior, community dynamics, or research findings for decades, be they positive or negative. This is why it is critical that we urge the reader to think 'outside of the box' and embrace a new renaissance, a new era of scientific openness when considering how substance abuse research and its myriad of aberrant, deviant, and criminal behaviors might be directly and indirectly woven together when they embrace healthy or unhealthy choices. Researchers and scholars have reiterated for decades that no single discipline should operate in a vacuum. However, espousing such a noble goal but failing to practice what one preaches are two separate things. Arguably, the

Fig. 2.2 An epidemiological criminology model for explaining criminal and deviant behavior



resources and infrastructure for transdisciplinary research, with a sway towards substance abuse research methodologies and theories, are already beginning to take shape and see a new light of day, a new enlightenment. Now, it is up to us as scholars and practitioners to push the boundaries, or venture down Alice's rabbit hole, to embrace the unknown and confront our fears in order to make a difference in the intellectual landscape of the future.

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