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B. F. Skinner's *Science and Human Behavior*: Some Further Consequences

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Skinner's (1953) Science and Human Behavior suggested that a science of human behavior could potentially have both negative and positive impacts on human welfare. The present paper first outlines how the contemporary gambling, and advertising, industry illustrate several of *Skinner's (1953)* concerns and then discusses how medicalization and the critical psychiatry movement share important epistemological similarities with Skinner's work. *Skinner (1953)* worried that a science of human behavior might negatively impact human welfare, and Skinner's concerns, and potential solutions, are explored in the context of current research.

Keywords: advertising, critical psychiatry, gambling, medicalization, B. F. Skinner

A science of behavior does not contain within itself any means of controlling the use to which its contributions will be put.

—*Skinner, 1953*, p. 437

The above quote, from *Skinner's (1953)* book, *Science and Human Behavior*, shows that Skinner was well aware that a science of human behavior might have both negative and positive consequences for human welfare. Indeed, *Skinner (1953)* begins his book by discussing the misuse of science, such as how a science that eventually led to the development of modern aircraft may not have foreseen subsequent warfare including bombing and paratrooper release.

The format and title of this paper liberally borrows from an important paper in behavior analysis, authored by Charles Catania, titled "B. F. Skinner's *Science and Human Behavior*: Its antecedents and its consequences." In this previously published paper, *Catania (2003)* outlined some antecedents to *Science and Human Behavior*, including *The Behavior of Organisms (Skinner, 1938)* and *Principles of Psychology (Keller & Schoenfeld, 1950)* and also discussed some consequences, such as in education and behavioral therapy. *Catania (2003)* was troubled, however, that misunderstandings of Skinner's behaviorism were common in undergraduate psychology textbooks and that behavior analysis had not spread as much as Skinner might have wished. Nevertheless, *Catania (2003)* was hopeful that *Science and Human Behavior* might also set the stage for the extension of *Skinner's (1953)* writings to other research topics.

The present paper advances *Catania's (2003)* analysis by outlining how *Science and Human Behavior* set the stage for the extension of *Skinner's (1953)* writings to four research topics that were not included in *Catania's (2003)* original paper. These topics include the contemporary gambling, and advertising, industry, the

sociological concept of medicalization, and the contemporary critical psychiatry movement. Because *Catania (2003)* was not alone in suggesting that Skinner's ideas have been misunderstood (*Richelle, 1993*), the present paper first outlines how the contemporary gambling, and advertising, industry nicely illustrate several of *Skinner's (1953)* concerns. Following this, the present paper extends *Skinner's (1953)* writings to the sociological concept of medicalization and the contemporary critical psychiatry movement and highlights the epistemological similarities with *Skinner's (1953)* seminal book.

Gambling

In broad strokes, the gambling industry may attempt to induce a person to gamble by, for example, manipulating the external environment, such as the particular payout schedule of a slot machine (the independent variable) and then measuring the increased profits resulting from gambling (the dependent variable). For example, consider the random possibility that a three-reel slot machine may generate a near miss in which the first and second reel may land on a winning symbol (such as a cherry), but the cherry falls just above, or below, the winning position on the third reel. Because a near miss may boost gambling profits (with no cost to the owner of the device), artificially inflating near misses may be lucrative. In fact, the gambling industry has been legally permitted to artificially inflate near misses since at least 1988 (*Harrigan, 2009*), and there is evidence that gambling behavior does increase (*Reid, 1986*). *Skinner (1953)* also noted that slot machines effectively use conditioned reinforcers by pairing certain symbols with economic rewards and that almost hitting the jackpot when two (but not three) winning symbols appear "increases the probability that the individual will play the machine, although this reinforcer costs the owner of the device nothing" (p. 397).

Whereas *Skinner (1953)* famously outlined how operant conditioning was a function of the antecedents and consequences of behavior, *Skinner (1953)* also suggested that, even in the absence of explicit reinforcing or punishing consequences, environmental stimuli might alter behavior in a causal chain consisting of three links. These three links consisted of an operation performed on the organism from without (the first link), an inner condition within

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the organism (the second link), and a kind of behavior (the third link). For example, Skinner (1953) noted that when we attempt to induce a person to drink water,

we have a causal chain consisting of three links: (a) an operation performed upon the organism from without—for example, water deprivation; (b) an inner condition—for example, physiological or psychic thirst; and (c) a kind of behavior—for example, drinking. (p. 34)

Skinner (1953) suggested a complete understanding of the second link may not be needed to alter behavior and that “we cannot account for the behavior of any system while staying wholly inside it; eventually we must turn to forces operating upon the organism from without” (p. 35).

Note that Skinner’s (1953) three-link causal chain is nicely illustrated by the gambling near miss in which there is an artificial inflation of near misses (the first link), an inner condition within the gambler (the second link), and increased gambling behavior (the third link). Just as Skinner (1953) suggested that a complete understanding of the second link may not be needed to alter drinking behavior, a complete understanding of the second link may not be needed when the gambling industry discovers that artificially inflating near misses increases gambling behavior. In Skinner’s (1953) words “unless there is a weak spot in our causal chain so that the second link is not lawfully determined by the first, or the third by the second, then the first and third links must be lawfully related” (p. 35).

In addition to artificially inflating near misses, the gambling industry has altered a variety of other independent variables that may increase gambling behavior. These include accelerating play by replacing pull handles with push buttons, adding stop buttons that purport to stop the spinning reel (but do not), artificially inflating stops at blank symbols, disguising losses as wins, providing casino credit cards that give reward points for cash advances, using casino teller machines that bypass cash withdrawal limits, and designing maze-like casino layouts that prevent patrons from moving directly through a property (Schull, 2012). Additional environmental enrichments that may increase a gambler’s time on a device include ergonomically designed chairs, touchscreens with haptic feedback, and computerized menus that provide additional gambling options and allow players to communicate requests (such as for alcohol) to casino employees (Schull, 2012). Most troubling, however, is that slot machine manufacturers “staff departments of advanced mathematicians who run so-called math farms to simulate the efficacy of different payout schedules” (Schull, 2012, p. 109). Skinner (1953) also expressed concerns with gambling and worried that because the predisposition to continue gambling was determined by the reinforcement schedule, problematic gambling might become more common in the future because “the probability that a man will place a bet of a given size . . . can be studied experimentally” (p. 396).

Advertising

In broad strokes, the advertising industry may attempt to induce a person to purchase a particular product by manipulating an independent variable, such as a salient image in an advertising campaign, and then measuring the dependent variable of increased profits resulting from sales. Skinner (1953) warned that

a degree of effective control not so easily identified rests in the hands of . . . advertisers . . . since a science of behavior will continue to increase the effective use of this control, it is now more important than ever to understand the processes involved and to prepare ourselves for the problems which will certainly arise. (p. 22)

For example, evidence that fast food advertisements increase childhood obesity (Hastings, McDermott, Angus, Stead, & Thomson, 2006) or that alcohol advertisements increase youth drinking (Gordon, 2011) may be due, in part, to the corporate hiring of psychologists who can specifically use their information and skills to target children and teens directly (Kramer, 2006). Perhaps not surprisingly, there has also been an increase in gambling advertisements in many countries (Binde, 2014). For example, in Canada, gambling advertisements were introduced by taking advantage of various loopholes in the gaming and betting provisions of the Canadian Criminal Code (McMullan & Miller, 2008).

Although Skinner’s (1957/1992) *Verbal Behavior* was still 4 years from publication, Skinner (1953) worried that a shrewd choice of words by a salesman or advertising campaign might also promote excessive consumerism. For example, Skinner (1953) wrote that “sales may be encouraged by promises of immediate delivery” (p. 393), that “testimonial advertising sets up imitative patterns for the potential buyer” (p. 393), and that sales increase “when the salesman assures the potential buyer that he will enjoy or profit from a purchase” (p. 316). Recently the gambling industry has subtly changed the word “gambling” to “gaming,” and there is evidence that although the word gambling is associated with crime and regulation the word gaming is associated with entertainment and fun (Humphreys & Latour, 2013). Skinner (1953) later concluded that verbal behavior gains increasing importance when “the verbal stimulus generated by the speaker alters the probability of a verbal or nonverbal response in the listener” (p. 410).

The effectiveness of advertising may also benefit from the mere exposure effect in which repeated presentations of various external stimuli (including random geometric figures, nonsense words, or Chinese characters) may unconsciously increase preferences, without requiring conscious recognition or cognitive appraisal (Zajonc, 2001). Because empirical research has increasingly shown that various external stimuli can alter human behavior, outside conscious introspective awareness (Goddard, 2009), the mere exposure effect may simply be an additional example of this process. Skinner (1953) may also have anticipated the mere exposure effect when he wrote that “as the doctrine of the unconscious has emphasized, we may not be able to report at all upon events which can be shown to be reinforcing to us” (p. 82).

Pollay (1986) has noted that although the intent of advertising is a rather pedestrian one of increasing sales (readily transparent to young children), a number of prominent scholars from several academic disciplines have expressed concerns with the unintended consequences of advertising. For example, by exploiting commonplace human anxieties of weight gain, aging, or unemployment, advertisers may generate profound dissatisfaction in many ordinary people who cannot possibly be as thin, young, or wealthy as the carefree models shown in their repetitive messages (Pollay, 1986).

Oddly, the profound dissatisfaction generated by the advertising industry may profit the gambling industry. For example, Schull (2012) has presented evidence that some people may gamble less

for financial gain than for the opportunity to enter “the zone” in which a focused attention on gambling reduces the profound dissatisfaction of a painful or distracting set of life circumstances (see also Csikszentmihalyi, 2014). Skinner (1953) also discussed such negative reinforcement and suggested that drug use might be negatively reinforced by reducing the “painful or distracting stimuli which cannot otherwise be altered easily” (p. 237). Relatedly, contemporary slot machines have sometimes been referred to as “the crack cocaine of gambling” (Dowling, Smith, & Thomas, 2005, p. 36).

Medicalization

Given the current practices of the gambling, and advertising, industry, it may be surprising that there is relatively limited regulation of both industries, including the recent increase in Internet gambling (Griffiths, Parke, Wood, & Parke, 2006). This limited regulation, however, was anticipated by Skinner (1953) when he wrote that although the coercive abuse of power is obvious and generates opposition (or countercontrol), noncoercive power is less obvious and generates less opposition.

For example, Skinner (1953) noted that coercive power, such as a tyrannical government that acquires wealth using force or punishment, frequently generates opposition in the exploited populace. However, rather than using coercive power, the gambling and advertising industry may acquire wealth using noncoercive techniques that avoid the use of force or punishment. For example, slot machines may use variable ratio schedules of reinforcement, or advertisers may pair consumer products with “pretty girls, babies, and pleasant scenes” (Skinner, 1953, p. 57). Skinner (1953) warned, however, that “behavior is determined in noncoercive ways” (p. 438) and worried that “we have no guarantee that the power thus generated will be used for what now appear to be the best interests of mankind” (p. 437). Skinner (1953) also hypothesized that because noncoercive behavioral control was less obvious, there was a tendency to attribute the behavior to an internal personality trait; for example, gambling problems might be erroneously attributed to a gambler’s strong drive or gambling “complex” (p. 146).

The tendency to attribute behavior to an internal personality trait closely resembles what sociologists have termed medicalization, in which, beginning sometime around 1970, human problems were increasingly defined as medical illnesses or diseases (Conrad & Barker, 2010). For example, “pathological gambling” became an official mental illness in 1980 and was later renamed “gambling disorder” in 2013 (Straussner, 2013). Conrad and Barker (2010) suggested that a troubling aspect of medicalization is that it may overstate medical solutions (particularly pharmaceutical solutions) and may understate social or environmental solutions to complex human problems (see also Mayes & Horwitz, 2005).

Perhaps not surprisingly, the gambling industry has embraced the medicalization of gambling because more attention has focused on the putative biological, genetic, and neurological profile of the mentally ill gambler and less attention has focused on the dubious ethical practices of the gambling industry (Reith, 2007). Similarly, as advertisers continually develop more persuasive techniques, some people may inevitably engage in excessive consumer spending. However, with the medicalization of excessive consumer spending, with the mental illness of “compulsive buying disorder”,

the advertising industry may avoid regulation just as the gambling industry avoided regulation with the medicalization of excessive gambling (Lee & Mysyk, 2004).

In addition, Conrad (2005) presented evidence that the medicalization of several human behaviors, including childhood hyperactivity and adult shyness, was relatively rapid and was likely driven by commercial and market interests rather than by scientific data. The relative ease and rapidity of medicalization resembles Skinner’s (1953) apprehensions that an even more common practice is to explain human behavior in terms of an inner agent, as when delinquent behavior is attributed to a “disordered personality” (p. 29). Later, Skinner (1953) concluded that “the fictional nature of this form of inner cause is shown by the ease with which the mental process is discovered to have just the properties needed to account for the behavior” (p. 30).

Critical Psychiatry

With psychiatric labels, like “gambling disorder” or “compulsive buying disorder”, both psychiatry and critical psychiatry would likely agree that problematic behavior is interfering with daily living (Skinner’s third link) and that such problematic behavior may partly be a function of environmental stimuli or stressors (Skinner’s first link). However, psychiatry and critical psychiatry typically disagree on the underlying inner condition (Skinner’s second link). In general, psychiatry hypothesizes that a biological dysfunction likely exists and critical psychiatry hypothesizes that a biological dysfunction likely does not exist (Goddard, 2014). Critical psychiatry also shares Skinner’s (1953) concerns that psychiatry’s emphasis on hypothetical inner causes may be misplaced and that emotional distress and disordered behavior may arise from environmental stressors rather than internal pathology (Goddard, 2014).

With physical illnesses, like malaria, diabetes, or cancer, an underlying biological marker can be independently measured, which would clearly satisfy Skinner (1953) as “independent information about the second link would obviously permit us to predict the third without recourse to the first” (p. 34). However, with most mental illnesses, no underlying biological marker can be independently measured (Jacobs & Cohen, 2010), which would worry Skinner (1953) as psychotherapy “is rich in explanatory fictions” (p. 373). Skinner (1953) also noted that clinicians have “encouraged the belief that psychotherapy consists of removing certain inner causes of mental illness” (p. 373) and hypothesized that locating these inner causes may be “an impossible assignment” (p. 373).

Of course, it is possible that Skinner (1953) might be only partly correct because a biological dysfunction may be absent in some disorders (like “compulsive buying disorder”) but may be present in others (like “schizophrenia”). Particularly when a person exhibits unusually bizarre behavior (like hearing voices), the general public may find it difficult to imagine that such bizarre behavior might arise from a particular constellation of environmental stimuli or stressors in an ordinary person (see also Horwitz, 2002).

Boyle (2006), however, has presented evidence that intense social isolation, coupled with severe environmental stressors, may precipitate voice hearing in some ordinary people and that voice hearing may provide companionship, and comfort, and may reduce the stress of having to make independent decisions (see also

Modrow, 2003). Boyle's (2006) analysis is supported by research showing that schizophrenia treatments reducing social isolation and stress may show recovery rates greater than psychiatric drug use (Bola & Mosher, 2002) and that increased psychiatric drug use appears to worsen, rather than improve, recovery rates in several countries (Whitaker, 2010). Any genetic contribution to schizophrenia might also be due to the inheritance of personality, or physical, characteristics that increase the risk of social isolation or mistreatment (Joseph, 2004), and neuroimaging and postmortem studies (showing reduced brain volume and increased ventricular size) may have resulted from the confound that psychiatric drugs were administered to patients, rather than healthy controls (Moncrieff & Leo, 2010). Note also that even if some percentage of patients had a biological dysfunction, the absence of a biological marker makes it difficult to determine false positive rates (Frances, 2009); some patients have also been quite startled at the somewhat haphazard assignment of psychiatric labels that may precipitate drug administration (for examples, see Goddard, 2011; Hagen & Nixon, 2011).

Skinner (1953) warned that hypothetical inner causes may be counterproductive because research attention is misdirected "toward a supposed underlying condition rather than toward the behavior itself or the manipulable variables outside the organism to which the behavior may be traced" (p. 374). Skinner (1953) later concluded that

by accounting for a given example of disadvantageous behavior in terms of a personal history and by altering or supplementing that history as a form of therapy, we are considering the very variables to which the therapist must ultimately turn for an explanation of his supposed inner causes. (p. 379)

Summary and Conclusion

Skinner's (1953) book *Science and Human Behavior* suggested that a science of human behavior could potentially have both negative, as well as positive, impacts on human welfare. The present paper outlined how the contemporary gambling (and advertising) industry nicely illustrated several of Skinner's (1953) concerns and suggested that limited regulation of both industries may have partly resulted from Western cultures increasingly defining human problems as medical illnesses (medicalization). The critical psychiatry movement also shares Skinner's (1953) apprehensions that medicalization may be overstated in psychiatry.

Although many academics may consider Skinner history, this view may be altered when comparisons show striking epistemological similarities between Skinner's writings and topics that are of interest to many psychologists today. For example, Skinnerian behaviorism shares important similarities with positive psychology (Adams, 2012), current empirical research in psychology (Goddard, 2012), and critical psychology (Goddard, 2014), suggesting Skinnerian behaviorism may be reintegrated with mainstream psychology (Overskeid, 2008). Perhaps surprisingly, Skinner and Chomsky may also have shared worldviews that were more compatible than incompatible (Goddard, 2015). The present paper joins these efforts by showing that Skinner's (1953) writings anticipated current problems in the gambling (and advertising) industry and shared important similarities with the sociological concept of medicalization and the contemporary critical psychiatry movement.

When *Science and Human Behavior* was written, Skinner (1953) was optimistic that a science of human behavior might have more positive (rather than negative) impacts on human welfare. However, later in life, Skinner became less optimistic (Chance, 2007). Readers can now place their bets.

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