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A systematic review of smoking Youths' perceptions of addiction and health risks associated with smoking: Utilizing the framework of the health belief model

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Objectives: **The purpose of this paper was to systematically appraise youths' perceptions of tobacco-cigarette-related addiction and health risks.**
Methods: **Five electronic databases were searched for articles relating to youth, smoking, and risk perception, and the references of relevant articles were hand searched resulting in 10 studies with over 2500 participants meeting the inclusion/exclusion criteria. Articles were systematically appraised based on risk perception according to susceptibility, severity, barriers, and benefits. Perceptions of health risks and addiction were categorized as optimistic among smoking youth, pessimistic among non-smoking youth, and realistic among a portion of older smoking youth.**
Results: **Smoking youth were optimistic and held self-exempting beliefs regarding likelihood of addiction, ability to quit, mortality, and tobacco-related diseases. Youth rationalized smoking by perceiving barriers to quitting as more relevant than the benefits of quitting, with this balance shifting when youth decided to attempt cessation.**
Conclusions: **Implications of these findings are widespread and offer insight for researchers, educators, and cessation interventionists, as awareness of self-exempting beliefs held by smoking youth creates a vantage point to facilitate behaviour change.**

Keywords: *Smoking, youth, perceptions of addiction, health risks, health belief model*

INTRODUCTION

Smoking was a leading cause of preventable death in the world (Fagerstrom, 2002). In 2008 the proportion of youth smokers remained relatively unchanged from 2007, with approximately 20% of North American youth aged 15–19 years smoking (Center for Disease Control and Prevention (CDC), 2010a; Statistics Canada, 2008). The relatively unchanged proportion of youth smokers indicated a stabilization in smoking rates (Morgan, Backinger, & Lesichow, 2007). This stabilization was concerning as youth continued to initiate and perpetuate smoking behaviour despite the well-known and adverse risks to their health (Fagerstrom, 2002; Shields, 2005).

In conjunction with the adverse health risks associated with smoking, the cost incurred in North America due to smoking-related diseases was astronomical. The economic impact of smoking could be divided into healthcare dollars, productivity loss, and years of potential life lost. Annually, over 100 billion dollars were spent on healthcare costs attributed to tobacco and tobacco-related diseases (CDC, 2010b; Public Health Agency of Canada, 2009). The financial impact of tobacco was further amplified when loss of productivity was accounted for with estimates approaching an additional 100 billion dollars annually (CDC, 2010b; Public Health Agency of Canada, 2009).

Among the many costs associated with smoking, the most notable was mortality. Estimates of smoker mortality resulting from tobacco-related diseases have been cited as high as 50% in North America with tobacco accounting for 18% of deaths annually (Doll, Peto, Boreham, & Sutherland, 2004; Heron et al., 2006). Consequently, both the economic and human losses associated with smoking position tobacco research as a societal necessity.

Of particular concern was the estimation that over half of smokers become addicted to nicotine before

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they can legally purchase tobacco products (Radecki & Zdunich, 1993). Every day approximately 6000 youth across North America tried smoking for the first time and more than half of those youth become regular smokers (Asumda & Jordon, 2009; Giovino, 1999). Most smokers reported starting smoking before 16 years of age, with tobacco experimentation being reported by youth as young as 10 years of age (Asumda & Jordon, 2009; Croghan, Aveyard, Griffin, & Cheng, 2003). The average age of smoking initiation in North America was 12.1 years (Center for Disease Control and Prevention, 2007; CTUMS, 2009). Given the vast majority of smoking was initiated during youth, these formative years are a critical time to create change. Gaining insight into how youth reconciled their smoking behaviour with the many risks associated with smoking is paramount to help change smoking behaviour.

OBJECTIVE

The purpose of this systematic review was to appraise youths' perceptions of tobacco-cigarette-related addiction and health risks. For the purpose of this paper, tobacco-cigarette-related addiction referred to cigarette smoking addiction. Moreover, the following operational definitions were utilized: youth was defined as 12–22 years of age; and perceptions were defined as awareness or understanding of any sensory information based on susceptibility, severity, barriers, and benefits (Passer, Smith, Atkinson, Mitchell, & Muir, 2002).

Search strategy

To address the purpose of this systematic review, five electronic databases were searched for articles pertaining to youths' perceptions of tobacco-cigarette-related addiction and health risks: CINAHL; ProQuest Psychology Journals; PsycINFO; PubMED; and SCOPUS. The search strategy included both MeSH terms and free-text terms related to smoking, youth, and risk perception and included: smoking terms such as smoking, smoker, nicotine, and smok*; age terms such as teens, adolescents, 12–22 years, youth, and young adult; risk terms such as risk, relative risk, personal risk, and risk perception; and impact terms such as invincibility, in denial, denial, invulnerable, and optimism (see Appendix A for the complete search strategy). These searches generated 74 potential articles, 22 different studies, and each article's reference list was hand-searched for additional studies.

Inclusion/exclusion criteria

To meet the inclusion criteria, each included study considered was a primary investigation focused on youth between 12 and 22 years of age with no co-morbidities. Additionally, each study addressed at least one facet of the purpose statement; was written or translated into English; focused on a North American population; and considered risk associated with cigarette smoking only. These criteria were selected to ensure a sufficient number of articles were generated for this review. Studies were limited to North America to minimize cultural differences such as smoking laws and law enforcement. Exclusion criteria included studies with both adult and youth participants where findings were not separated and studies that amalgamated various forms of tobacco addiction such as cigar smoking and spit tobacco. Ten studies, with over 2500 participants, met the aforementioned inclusion and exclusion criteria and form the basis of this review.

METHODS

Once a study was identified as eligible for this systematic review the study design, sample size, setting, participant information, intervention, and outcome data were extracted utilizing a data collection form. Subsequently, sources of potential bias were assessed and documented including allocation, blinding, selective reporting, attrition, compliance, and adequacy of procedures. Both aforementioned forms were created based on methods described by the Cochrane Collaboration (Higgins & Green, 2008). Studies were summarized in alphabetical order in Table 1.

Both the theories of Cognitive Dissonance and the Health Belief Model were central in explaining youths' smoking-related perceptions and were utilized to lay a contextual behavioural foundation for this systematic review. Both Festinger's (1957) theory of Cognitive Dissonance and Becker's (1974) Health Belief Model posited a rationality between a person's behaviours and his/her beliefs, attitudes, and intentions. Both of these social-cognitive models postulated action based on the reconciliation of motivation(s) and perception(s) (Becker, 1974; Festinger, 1957). Specifically, Cognitive Dissonance theory stated mutually exclusive cognitions created a state of dissonance resulting in psychological discomfort, which in turn motivated change in attitudes or

beliefs to justify and rationalize the individual's behaviour (Festinger, 1957). Dissonance caused by logical inconsistencies resulted in anxiety stemming from guilt, anger, frustration, and/or embarrassment (Festinger, 1957). This anxiety led to the fabrication or justification of support for one's decision, or the endorsement of self-exempting beliefs with a subconscious goal of reducing dissonance (Festinger, 1957). Similar to the Cognitive Dissonance theory, the Health Belief Model hypothesized health-related actions were based on the interaction between motivation, perceived threat of a health problem, and threat reduction at an acceptable cost (Becker, 1974). The Health Belief Model proposed that beliefs impacted attitudes, which impacted intention, which impacted behaviour (Becker, 1974). This model, based on a 'hierarchy-of-effects' principle purported cause-and-effect relationships among a person's behaviours and his/her beliefs,

Table 1. Summary of studies.

Summary of studies included in this systematic review from 1996 to 2010

Author	Methodology	Methods	Results
Arnett (2000)	Quantitative	$N = 200$ youth (aged 12–17 years) – Completed a two-part questionnaire assessing smoking behaviour and attitudes, and smoking risk perceptions – 24% reported smoking last month (were classified as smokers)	– Smokers were significantly less likely than non-smokers to agree the majority of people who smoked became addicted (odds ratio = 2.05) – 60% of smokers believed they could quit without difficulty, but also agreed smoking for a few years typically results in addiction/an inability to quit – Smokers were significantly more likely that non-smokers to doubt they would die if they became lifelong smokers (odds ratio = 1.38)
Balch (1998)	Qualitative	$N = 9$ focus groups each hosting 6–11 smoking students (aged 14–18 years) – Aimed at gaining a greater understanding of smoking behaviour, benefits and disadvantages to smoking, and thoughts about quitting	– Emergent themes: smoking relaxes and calms participants; smoking for mood control; smoking as a social experience; social bonds formed among smokers; lack of urgency to quit; sense of invulnerable to tobacco-related diseases; and physical and economic benefits to quitting – Themes among males: smoking as a form of rebellion and a means to challenge authority – Theme among females: smoking as a weight control tool
Gerrard et al. (1996)	Quantitative	$N = 231$ male and $N = 246$ female (grades 8–10) – Three-year longitudinal study – Completed questionnaires annually to gain insight into risky behaviours, perceived invulnerability, thoughts on health, and estimates of smoking prevalence	– Smoking was associated with a significant increase in perception of risk ($\beta = 0.35$) – Smoking was associated with an almost significant decrease in perception of health and safety ($\beta = -0.20$) – Smoking prevalence estimates increased significantly across time ($\beta = 0.11$)
Halpern-Felsher et al. (2004)	Quantitative	$N = 395$ youth (aged 12–15 years) – Sample from two public high schools – Completed in-class questionnaires assessing smoking experiences, intentions, and perceived risks/benefits of smoking. – Sample included 100 smokers and 295 non-smokers	– Youth intending to smoke in next six months (intenders) had significantly lower estimates of ability to quit ($r = 0.043$), likelihood of becoming addicted ($r = -0.151$), likelihood of still smoking in five years ($r = -0.128$), and ease of cessation ($r = -0.175$) compared to youth with no intention of smoking in next six months (non-intenders) – Intenders had significantly higher estimates that smokers were relaxed ($r = 0.175$), looked cool ($r = 0.218$), and looked grown-up ($r = 0.133$) when compared to non-intenders. No differences between intenders and non-intenders were found when comparing perceptions of smokers as being thinner or popular

(*continued*)

Table 1. Continued.

Summary of studies included in this systematic review from 1996 to 2010

Author	Methodology	Methods	Results
			– Intenders had significantly lower estimates than non-intenders of health risks associated with smoking including: $r = -0.227$; trouble breathing, $r = -0.226$; bad colds, $r = -0.178$; bad breath, $r = -0.258$; lung cancer, $r = -0.195$; heart attack, $r = -0.173$; and wrinkles, $r = -0.133$
Milam et al. (2000)	Quantitative	$N = 442$ students (grades 9–12) – Completed a questionnaire assessing health values, body awareness, social pressure, and invulnerability – 220 participants were smokers	– Majority of youth believed in a personal invulnerability to cigarettes and addiction ($r = -0.26$) – Youth prescribing to personal invulnerability were less likely to quit smoking ($r = -0.19$) when compared to smokers who acknowledged risks – Majority of smokers made fewer quit attempts ($b = -0.39$) than smokers who acknowledged risks – Smokers placed significantly lower value on health compared to non-smokers ($r = 0.18$)
Moffat and Johnson (2001)	Qualitative	$N = 12$ female youth (aged 14–17 years) – Completed one-hour individual in-depth interviews focused on the participant's story of smoking – Analyzed utilizing Narrative Inquiry	– Emergent themes: control over addiction or *invincibility; unanticipated addiction*; distinction between wanting and needing to quit
Nichter et al. (1997)	Mixed methods	$N = 205$ girls (grades 8–11) – Three-year longitudinal study – Completion of an extensive survey, focus groups, and telephone interviews to glean insight into patterns of smoking experimentation and initiation – Data were analyzed from an ethnographic perspective	– Smokers believed they were not addicted and could quit anytime – Over 40% estimated half of the girls in their grade smoked – Over 40% estimated US smoking prevalence to be 45% – 59% of regular smokers were significantly less likely to agree smoking had harmful effects on health when compared with occasional smokers (74%) and non-smokers (91%), $p < 0.0001$ – Emergent themes: control over smoking; smoking as a coping mechanism for school and family stress; smoking to rebel; and smoking to look cool (8%)
Romer and Jamieson (2001)	Quantitative	$N = 600$ youth (aged 14–22 years) – Purposeful recruitment through random digit dialing with half of the participants required to be smokers – Completed questionnaires assessing both objective and personal risks of smoking – 300 smokers and 300 non-smokers	– 40% underestimated the average number of years of life lost due to smoking – 68% of smokers and 79% of non-smokers estimated smoking would reduce life span (odds ratio = 0.967). – Almost half of the smokers were cognisant of mortality rates associated with smoking but many underestimated their own mortality risk

(*continued*)

Table 1. Continued.

Summary of studies included in this systematic review from 1996 to 2010

Author	Methodology	Methods	Results
			– 41% of smokers and 27% of non-smokers underestimated or did not know the risks of smoking on health – Youth overestimated adult lung cancer rates with 14–15-year olds estimating 61.4% and 20–22-year olds estimating 52.6% There was a significant decline ($t(556) = 0.286$, $p < 0.005$) across age groups but both were overestimates – 81% of smokers were planning on quitting, intentions to quit were higher among smokers who perceived a greater than 60% risk of mortality associated with smoking as compared to those who estimated mortality at less than 40%
Wolburg (2006)	Qualitative	$N = 150$ (American college students) – Completed in-depth interviews aimed at gaining insight into anti-smoking campaigns. – Half of sample were smokers	– Many smokers were confident in ability to quit smoking before the risks became problematic – Many smokers decided benefits of smoking outweighed risks
Wolburg (2009)	Qualitative	$N = 15$ (Smoking college students) – Conducted in-depth individual interviews aimed at gaining an understanding of reasons for cessation – Analyzed using the constant comparative method	– Emergent themes: fear of addiction which motivated cessation; and fear of lack of control over smoking – Once participants decided to quit, the benefits became prevalent and included both physical, economical and an increased urgency to quit

attitudes, and intentions were rational (Ajzen & Fishbein, 1975). If beliefs, attitudes, or intentions were based on misconceptions or inaccurate knowledge, the resulting behaviour was irrational. Consequently, both the Health Belief Model, which hypothesized cognitions (regardless of fact) predicted behaviour and the Cognitive Dissonance theory, when ill-informed beliefs, attitudes, or intentions facilitated the creation of self-exempting beliefs to reconcile beliefs, attitudes, and intentions with opposing behaviour.

Self-exempting beliefs, optimistic bias, personal immunity, or unrealistic optimism were synonymous with the notion that individuals who engaged in risky behaviour, such as smoking, continued to do so without experiencing negative consequences (Weinstein, 1982, 1987, 1989). Optimistic bias was based on the perception that risk was greater for others than for self (Arnett, 2000). Moreover, when youth smokers did not experience negative consequences while engaged in risky behaviour, the behaviour was perpetuated further and misconceptions were reinforced (Gerrard, Gibbons, Benthin, & Hessling, 1996). Optimistic bias impacted both addiction and willingness to engage in various health risks, as an individual's risk perception did not equate with actual risk.

Although studies used various methodological constructs to contextualize their findings, the Health Belief Model was selected to frame the findings of this systematic review as it provided an encompassing approach to summarize the results. Results pertaining to perceptions of smoking-related addiction and health beliefs were presented using the constructs of the Health Belief Model, specifically: perceived susceptibility to addiction, perceived severity of smoking risks, perceived barriers to cessation, perceived benefits to quitting, and rationalisations to reduce cognitive dissonance as sub-headings.

RESULTS

Perceived susceptibility to addiction

Susceptibility was the likelihood of being affected or, in terms of smoking, the likelihood of becoming addicted. A study by Nichter, Nichter, Vuckovic, Quintero, and Ritenbaugh (1997) described a recurring

salient theme of feeling in control of the smoking habit, with many smokers believing they were not addicted to cigarettes and could quit anytime. This theme was supported in a study conducted by Arnett (2000), which found youth smokers were significantly less likely than their non-smoking counterparts to agree that the majority of people who smoked became addicted (odds ratio = 2.05). Furthermore, 60% of youth smokers believed they could quit smoking in a few years without difficulty, despite the vast majority of them having acknowledged that smoking for a few years results in addiction and a consequent inability to quit (Arnett, 2000). Additionally, a study by Halpern-Felsher, Biehl, Kropp, and Rubinstein (2004) found youth who intended to smoke had significantly lower estimates of addiction than those with no intention of smoking in three of the four constructs utilized to assess addiction: ability to quit ($r = 0.043$), likelihood of becoming addicted ($r = -0.151$), likelihood of still smoking in five years ($r = -0.128$), and ease of cessation ($r = -0.175$).

In a study by Wolburg (2006), many smokers were found to be confident in their ability to quit prior to risks becoming problematic. One participant, whose sentiments represented a salient theme, had no intention of quitting and lacked concern for the risk associated with smoking saying, 'Nothing bad will happen to me now so why bother?' (p. 308).

Milam, Sussman, Ritt-Olson, and Dent (2000) found the majority of youth who prescribed to a personal invulnerability associated with cigarette smoking perceived they were less addicted to cigarettes ($r = -0.26$) and were less likely to quit smoking ($r = -0.19$) when compared to smokers who acknowledged a vulnerability to cigarette-related risks. Despite the shared perception of control over smoking and addiction held by many youth, Moffat and Johnson (2001) found mixed results. Moffat and Johnson (2001) described two competing themes: one of control over addiction or *invincibility*; and one of *unanticipated addiction*. The narrative of *invincibility* had many girls describing themselves as 'in-control' or 'not-addicted' and insistent on immunity to addiction. Conversely, the narrative of *unanticipated addiction* described the intense cravings of several girls, which resulted in their realization of addiction, with one young woman saying: '[w]hen I actually didn't have any [cigarettes], I couldn't stand it. It's like 'Oh my God, what's going on?' And, so then I knew [I was addicted]' (p. 674). Furthermore, Wolburg (2009) found participants described fear of addiction as a motivator to quit smoking. One participant described a fear of lack of control, which made him realize he was addicted: a sentiment echoed by several other participants in the study.

Perceived severity of smoking risks

Youth had a tendency to minimize the perceived severity of the risks associated with smoking. This minimization resulted in an optimistic bias, which, in turn, acted to relieve the dissonance between behaviour and beliefs, attitudes, and intentions (Becker, 1974; Ditto, Jemmott, & Darley, 1988; Festinger, 1957). Wolburg (2006) found many smokers who acknowledged some risk associated with smoking diminished the severity, decreased the importance, or simply ignored the potential impact of the risks. This underestimation of smoking risk was substantiated further in a study conducted by Romer and Jamieson (2001) who found 40% of participants underestimated the average number of years of life lost due to smoking. Furthermore, a difference in the estimation of years of life lost was observed between smokers and non-smokers: 68% of smokers and 79% of non-smokers estimated smoking would shorten life (odds ratio = 0.967). Of the nearly half of the smokers who were aware of the mortality rates associated with smoking, many of them continued to incorrectly view their own mortality risk associated with smoking as being lower (Romer & Jamieson, 2001). Conversely, Gerrard et al. (1996) found across time, continued smoking was associated with a significant increase in perception of risk ($\beta = 0.35$) and an almost significant decrease in the influence of smoking on health and safety ($\beta = -0.20$).

Nichter et al. (1997) found an indirect relationship between cigarette consumption and the severity of the risk associated with being a smoker. Nichter et al. (1997) found the girls who smoked regularly were significantly less likely to acknowledge smoking was harmful to health (59%) when compared to occasional smokers (74%), and non-smokers (91%), $p < 0.0001$. This underestimation of mortality due to smoking also was demonstrated by Arnett (2000) who found smokers were significantly more likely than non-smokers to doubt they would die if they became life-long smokers (odds ratio = 1.38). Furthermore, Romer and Jamieson (2001) found youth underestimated the risk of mortality as a result of smoking, with 41% of smokers and 27% of non-smokers underestimating or acknowledging they did not know the risk of smoking on health.

Perceived barriers to cessation

Several perceived barriers to quitting smoking have been identified by youth. Balch (1998) found participants felt relaxed and calm while smoking and used smoking as a means to control mood (Balch, 1998). Many participants highlighted the important social aspect of smoking and the benefit of the bond formed among smokers (Balch, 1998). In terms of gender specific barriers to quitting, for several males, smoking appealed to their rebellious nature and was a way to challenge authority; whereas, a few females cited weight control as a barrier to quitting (Balch, 1998). Additionally, participants in the focus groups lacked a sense of urgency to quit smoking despite expressing a desire to quit before adulthood (Balch, 1998). Moffat and Johnson (2001) further highlighted the lack of

urgency to quit as some participants depicted the important distinction between needing and wanting to quit smoking. Further denoting a lack of urgency to quit smoking, Milam et al. (2000) found the majority of smokers made significantly fewer quit attempts, $b = -0.39$ than smokers who acknowledged risks associated with smoking.

Similar to Balch (1998), Nichter et al. (1997) found many barriers to quitting. Almost half of the girls in the study reported smoking to be a coping mechanism for school-and family-related stress (Nichter et al., 1997). Furthermore, a few girls noted they smoked to rebel against parents and a minority of smokers, only 8%, reported smoking to look cool (Nichter et al., 1997). Compared to youth with no intention of smoking (i.e., non-intenders), Halpern-Felsher et al. (2004) found youth intending to smoke in the next six months (i.e., intenders) had significantly higher estimates that smokers were relaxed, looked cool, and looked grown-up, $r = 0.175$, $r = 0.218$, and $r = 0.133$, respectively. Interestingly, no significant differences were detected between intenders and non-intenders on being thinner or popular as a result of smoking (Halpern-Felsher et al., 2004).

Perceived benefits of quitting

Youths' perceptions of the benefits associated with quitting smoking were not as abundant in the literature, partly owing to the focus of risk in each of the articles and partly owing to the fact that many youth in the study were not contemplating quitting; an assumption based on the aforementioned notion that youth did not believe they were addicted (Milam et al., 2000; Nichter et al., 1997). However, some perceived benefits to quitting were described such as those in Romer and Jamieson's (2001) study in which the authors found 81% of smokers were planning to quit. Intentions to quit were higher among smokers who perceived a higher mortality risk ($>60\%$) as compared to smokers who estimated a lower mortality risk (<40%). The study by Wolburg (2009) found, once participants decided to quit, benefits became more apparent. Participants cited several benefits of quitting: amelioration of poor performance in physical activity due to increased lung capacity; financial gain due to monies not being spent on cigarettes; and the notion that time was running out to quit due to the assumption of a small window of opportunity for easy cessation (Wolburg, 2009). Balch (1998) also cited advantages to quitting including: increased athletic performance; more money; better breath; better smelling clothing; and non-yellow fingers.

Rationalisations to reduce cognitive dissonance

Reducing dissonance between a person's behaviour and his/her beliefs, attitudes, and intentions could be achieved through distortion of smoking statistics. Ross, Greene, and House (1977) described a 'false consensus' effect, occurring when individuals normalized behaviour by overestimating the prevalence. Nichter et al. (1997) found in excess of 40% of participants thought half of the girls in their grade smoked, and estimated the smoking prevalence among adults in the United States to be 45%: an overestimation by approximately 20%. Furthermore, Gerrard et al. (1996) found participants significantly increased smoking prevalence estimates across time ($\beta = 0.11$).

Balch (1998) found despite youth recognizing health risks associated with smoking they considered themselves, and people their age, to be invulnerable to tobacco-related diseases; an irrational thought perpetuating smoking behaviour (Balch, 1998). Milam et al. (2000) found smokers placed a significantly lower value on health compared to non-smokers ($r = 0.18$). A study by Halpern-Felsher et al. (2004) found individuals intending to smoke in the next six months had significantly lower estimates of various health risks compared with non-smokers including: bad cough, $r = -0.227$; trouble breathing, $r = -0.226$; bad colds, $r = -0.178$; bad breath, $r = -0.258$; lung cancer, $r = -0.195$; heart attack, $r = -0.173$; and wrinkles, $r = -0.133$. Wolburg (2006) found instead of acknowledging the risks associated with smoking many smokers decided benefits (i.e., pleasure) outweighed risks. Conversely, Romer and Jamieson (2001) found youth overestimated the risk of lung cancer: participants aged 14–15 years estimated 61.4% of adults would get lung cancer and participants 20–22 years estimated lung cancer prevalence to be 52.6% which, although a significant decline ($t(556) = 0.286$, $p < 0.005$), was nonetheless an overestimation.

THREATS TO VALIDITY/DATA TRUSTWORTHINESS

All studies included in this systematic review had sufficient quality to ensure findings were reliable (quantitative) or trustworthy (qualitative) (Guba & Lincoln, 1989). To generate a sufficient number of articles to complete a comprehensive review of research of youths' perceptions of cigarette-related addiction and health risks, broad inclusion and exclusion criteria were utilized. This resulted in articles with considerable differences in selection of participants, methods for quantifying risk, and methodologies. Each of the aforementioned differences merits discussion to ensure results were interpreted in an appropriate context.

Selection of participants

The selection criteria for participants within the studies varied widely from a set number of smokers and non-smokers to random samples. For instance, Halpern-Felsher et al. (2004) compared youth intending and not intending to smoke. Arguably, the perception of risk by a smoker as compared to a youth pretending or intending to be a smoker generated vastly different

risk assessments, as the individual was not partaking in the behaviour. Therefore, the participants had no need to reconcile opposing beliefs, attitudes, and intentions.

The definition of a smoker varied widely across studies and smoking definitions ranged from: smoking at least one cigarette in the last 30 days (Arnett, 2000; Balch, 1998; Romer & Jamieson, 2004); smoking any number of cigarettes per day (Milam et al., 2000); smoking a few times in the last month (Gerrard et al., 1996); having a smoking experience (Moffat & Johnson, 2001); smoking more than 100 cigarettes in their life (Wolburg, 2006, 2009); to the categorization into occasional and habitual smokers (Nichter et al., 1997). The inconsistency in the smoker definition was problematic, as researchers have found a directly proportional relationship between cigarette consumption and risk denial about the health hazards associated with smoking (Dawley, Fleischer, & Dawley, 1985; Halpern, 1994; Locken, 1982).

Methods for quantifying risk

Within risk perception literature, there were three main ways of assessing risk numerically: percentages; odds ratios; and lexical probability terms (i.e., 'likely' and 'probably'). Issues with participants correctly interpreting values for both percentages and odds ratios have been documented (Weinstein, 1998). The location of values on the response scale has been determined to impact participant interpretation of the risk (i.e., the lower limit of the scale representing low risk and the upper limit of the scale denoting high risk) (Sandman & Weinstein, 1994; Weinstein, 1998). Participants have had difficulty utilizing risk perception measurement tools including: the fact that percentages; odds ratios; lexical probability terms; and different scales were all utilized as a mean to measure risk in this review (Arnett, 2000; Halpern-Felsher et al., 2004; Nichter et al., 1997; Romer & Jamieson, 2001) each and/or all of these could have impacted results.

Methodologies

Studies utilizing both quantitative and qualitative methods were included in this review. Quantitative and qualitative research methods were designed inherently to approach the understanding of the relationship between constructs in different ways. Quantitative research focused on the numerical strength of the relationship and statistically significant factors; whereas, qualitative research focused on an individual or collective experience of the relationship (Hesse-Biber & Leavy, 2004). Qualitative research methods presented in this systematic appraisal utilized three different paradigmatic positions: post-positivism; ethnography; and narrative inquiry (Balch, 1998; Moffat & Johnson, 2001; Nichter et al., 1997; Wolburg, 2006, 2009). Conducting research through the lenses of these three paradigms answered the research question in very different ways. The positivistic paradigm proposed a single truth and, through research, the ability to glean imperfect but probabilistic insight into that truth (Hess-Biber & Leavy, 2004). Conversely, ethnographic research, a more holistic approach, was aimed at gaining an understanding of the individual within his or her context (Atkinson & Hammersley, 2007; Hess-Biber & Leavy, 2004). Narrative inquiry posited knowledge about behaviour could be understood using participants' stories to create collective experiences regarding behaviour (Hess-Biber & Leavy, 2004). Some qualitative researchers subscribed to the notion that the number of shared experiences across participants did not require a numerical value to demonstrate the strength of the result (Hess-Biber & Leavy, 2004). The vague terms used to quantify the number of participants who described a shared experience, their context, or their story used in this systematic appraisal was a reflection of the information provided in the articles.

CONCLUSIONS

The results of this systematic appraisal suggested youth were optimistic about their cigarette addiction, health risks, and consequences of smoking, and rationalized smoking by thinking perceived barriers to quitting outweighed perceived benefits. However, once the decision to quit was made, smokers were better able to identify the benefits of cessation.

Studies addressing perceived susceptibility to addiction yielded mixed results. Quantitative studies described an underlying belief of invulnerability to addiction as well as belief in the ability to quit at anytime (Arnett, 2000; Halpern-Felsher et al., 2004; Milam et al., 2000). Qualitative studies found mixed results in terms of invulnerability to both addiction and unanticipated addiction, with the latter being more common among older youth (Moffat & Johnson, 2001; Wolburg, 2006, 2009).

The perceived severity of the health risks and consequences associated with smoking were underestimated by youth with perceived risk increasing with smoking duration in quantitative studies (Arnett, 2000; Gerrard et al., 1996; Romer & Jamieson, 2001). A mixed methods study portrayed attempts by youth to minimize risk severity through normalization of smoking, with youth overestimating smoking prevalence among both same-aged youth and the general population (Nichter et al., 1997).

The perceived barriers to cessation often overshadowed the health risks associated with smoking until youth experienced a sense of urgency to quit at which time the benefits to quitting became prominent. Among qualitative studies, barriers to cessation included: emotional factors (i.e., coping, stress reduction, and relaxation); social factors (i.e., bonding, being cool, and rebellion); and lower values on health (Balch, 1998; Moffat & Johnson, 2001). Similar trends were documented in both quantitative and mixed-methods studies (Halpern-Felsher et al., 2004;

Milam et al., 2000; Nichter et al., 1997). The benefits to quitting were described once youth intended to quit. Specifically, qualitative studies tended to depict health, financial, and social benefits of quitting (Balch, 1998; Wolburg, 2009); and quantitative studies emphasized the unacceptable health risks associated with remaining a smoker (Romer & Jamieson, 2001).

These above-mentioned findings described perceptions of health risks and addiction as overly optimistic among smoking youth, pessimistic among non-smoking youth, and more realistic among some older smoking youth. This systematic appraisal shed light on the dissonant thoughts and irrationality of beliefs, attitudes, and intentions held by smoking youth and the subsequent impact on behaviour (Becker, 1974; Festinger, 1957). These findings underscored both the widespread prevalence and prolific nature of the fallacies held by smoking youth and elucidated that the dissipation of misconceptions did not necessarily occur with age (Kleinjan, van den Eijnden, Dijkstra, Brug, & Engels, 2006), but rather hinged on readiness to quit smoking (Kleinjan et al., 2006).

Many of the findings of this systematic appraisal were established previously in studies with adult smokers including: the self-exempting beliefs (Kleinjan et al., 2006, Peretti-Watel, Halfen, & Gremy, 2007); underestimation of addiction (Kleinjan et al., 2006; Peretti-Watel, 2007); and the relationship between intention to quit and increased perceptions of risk (McCoy et al., 1992). Furthermore, Lee (1989) found younger adults tended to underestimate the risk of addiction and disease when compared to older adults, a trend consistent with this review. However, research in the area of smoking-related risk perception is not always consistent. Previous researchers found discrepancies in the estimation of risk among smokers compared to both other smokers and non-smokers (Lee, 1989; McCoy et al., 1992; Williams & Clarke, 1997). Nonetheless, in a review of risk perception among adults, there was a consensus that, although not universal, the optimistic bias is widespread (Sutton, 1999).

Understanding the unrealistic optimism held by youth regarding cigarette-tobacco-related addiction and heath risks has important implications. Namely, understanding misconceptions provides a vantage point for the development of relevant educational initiatives and cessation programs. Educational initiatives aimed at deterring smoking in youth need to address not only commonly held misconceptions about risk to health and addiction but also make the relative risk of smoking more salient to youth. Oakes, Chapman, Borland, Balmford, and Trogger (2004) suggested making risk statistics more tangible to youth and encouraging youth to engage in more accurate cost-benefit analysis of smoking. Furthermore, initiatives need to focus not only on de-bunking misconceptions about smoking-related risks, but also need to focus on raising youths' awareness while being mindful of both the benefits and barriers youth perceive. When dealing with youth, care needs to be taken not to evoke a defensive reaction generating cognitive dissonance and irrationality in thought (Becker, 1974; Chassin, Presson, Rose, & Sherman, 1984; Das, De Wit, & Stroebe, 2003; Festinger, 1957) and using the understandings gained from this review may help to create an effective foundation from which to begin discussion.

This systematic review has several limitations, which in turn point to directions for future research. Firstly, the substantial age range and gender inequality in the sample utilized in this review in order to ascertain a sufficient number of studies is problematic. Future studies should separate out the ages of youths more finely (i.e., 14-year-olds separate from 18-year-olds) and more studies should be conducted with male participants. Secondly, the wide variety of tools utilized to assess risk (ranging from percentages, odds ratios, lexical probabilities, to qualitative strategies) could arguably impact results. Utilizing different tools to assess risk can result in assessing different constructs and could potentially be compounded by the aforementioned difficulty participants have in correctly interpreting quantitative risk measurement tools. Future studies should use several different scales for assessing risk perception and relative risk to triangulate results thereby increasing reliability. Moreover, almost half of the studies in this systematic appraisal were older than 10 years. Given recent tobacco legislative changes in North America (i.e., increased fines for retailers caught selling to minors in 2008, ban on 'power wall' displays in 2008, and bans of smoking in enclosed public places in 2006) (Ministry of Health Promotion, 2010) and the subsequent impact on norms, youths' perceptions of risk in these studies may no longer accurately reflect the risk perception of today's youth. Future studies should be conducted to obtain an accurate understanding of current youths' perceptions on the risks associated with tobacco. Finally, the lens of interpretation for this systematic review was the theory of Cognitive Dissonance and the Health Belief Model as such this may have constrained the data extracted and the way results were analyzed and presented. Future studies could look at utilizing a different theoretical lens to study perceptions of addiction to decrease potential biases.

Smoking youth hold many self-exempting and overly optimistic perceptions about addiction and health risks associated with smoking as compared to non-smoking youth and older youth. Researchers, educators, and cessation interventionists need to be aware of the various misconceptions held by smoking youth, the critical change period when youth intend to quit, and the ensuing opportunity to enable and facilitate change. Furthermore, through gaining a better understanding of the perceptions held by youth, the development of more effective educational and cessation strategies could be designed to engage smoking youth based on their receptivity to change.

Engaging smokers 'where they are' would optimize success in cessation and educational strategies and impact youth and society alike through: enabling youth to avoid unnecessary health risks; decreasing the negative impact on health; reducing the impact of smoking on the environment; diminishing healthcare costs associated with tobacco; and curtailing second-hand smoke exposure.

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APPENDIX A: SEARCH STRATEGY

Line 1: Smoking, smoker, nicotine, smok*
Line 2: Invincibility, in denial, denial, invulnerable, optimism
Line 3: Risk, relative risk, personal risk, risk perception
Line 4: Teens, adolescents, 12–25 years, youth, young adult

PsychINFO
Search Query: ((teens or youth or adolescents) or (12–22 years)) and ((smoker or smoking or smok*) and nicotine) and ((risk or (relative risk) or (personal risk)) or (risk perception)) and (invincibility or denial or (in denial or invulnerable or optimism))

Total found: 21
Total met inclusion criteria: 8

SCOPUS
Search Query: (TITLE-ABS-KEY (teens OR adolescence OR 12–22 years OR youth OR young adult)) AND (TITLE-ABS-KEY (risk OR relative risk OR personal risk OR risk perception)) AND (TITLE-ABS-KEY (smoker OR smoking OR nicotine OR smok$)) AND (TITLE-ABS-KEY (invincibility OR denial OR in denial OR invulnerable OR optimism)-TOTAL FOUND 0

Search Query: (TITLE-ABS-KEY (teens OR adolescence OR 12–22 years OR youth OR young adult)) AND (TITLE-ABS-KEY (smoker OR smoking OR nicotine OR smok$)) AND (TITLE-ABS-KEY (invincibility OR denial OR in denial OR invulnerable OR optimism))-TOTAL FOUND 4

Search Query: (TITLE-ABS-KEY (teens OR adolescence OR 12–22 years OR youth OR young adult)) AND (TITLE-ABS-KEY (smoker OR smoking OR nicotine OR smok$)) AND (TITLE-ABS-KEY (risk OR relative risk OR personal risk OR risk perception))-TOTAL FOUND 18

Total Found: 22
Total met inclusion criteria: 6

CINAHL
Search Query: ((teens or youth or adolescents or young adult) or (12–22 years)) and ((smoker or smoking or smok*) and nicotine) and ((risk or (relative risk) or (personal risk)) or (risk perception)) and (invincibility or denial or (in denial or invulnerable or optimism))

Total Found: 0
Total met inclusion criteria: 0
ProQuest Psychology Journals
Search Query: ((teens or youth or adolescents or young adult) or (12–22 years)) and ((smoker or smoking or smok*) and nicotine) and ((risk or (relative risk) or (personal risk)) or (risk perception)) and (invincibility or denial or (in denial or invulnerable or optimism))

Total Found: 11
Total met inclusion criteria: 4

PUBMED
Search Query: ((teens or youth or adolescents or young adult) or (12–22 years)) and ((smoker or smoking or smok*) and nicotine) and ((risk or (relative risk) or (personal risk)) or (risk perception)) and (invincibility or denial or (in denial or invulnerable or optimism))

Total Found: 20
Total met inclusion criteria: 9

Total (excluding overlap): 10