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Young Adult Smokers' Perceptions of the Influence of Physical Activity on their Smoking Patterns

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Abstract

Background: Physical activity has the potential to be an efficient and effective strategy for harm reduction and cessation among smokers. However, much remains to be known in this area of inquiry. The purpose of this study was to address the following question: "How do smokers perceive that physical activity affects their smoking behaviour?" **Methods:** Individual semi-structured interviews and one focus group were conducted with 12 physically active smokers aged 20 to 35. An iterative data collection–data analysis cycle was employed, and data were analysed using a detailed thematic approach. The approach included transcriptions being segmented into meaning units, and meaning units were then sorted and presented as relative themes. **Results:** Physical activity does appear to influence tobacco consumption and nicotine dependence; however, the positive or negative influence depends on a) the type, and b) the context of the physical activity. Within "type of activity," two specific themes were identified: 1) intensity of activity, and 2) perceived activity competiveness. Within the "context of activity," two specific themes were identified: 1) level of activity socialization, and 2) activity location. **Conclusions:** All health care professionals should consider integrating tailored physical activity promotion programs into their tobacco cessation initiatives.

Keywords

adults; cessation; harm reduction; physical activity; tobacco; smoking

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Background

Commercial tobacco is the only legal substance that kills many of its users when used exactly as intended by manufacturers (World Health Organization [WHO], 2012). Smoking is the leading cause of preventable deaths worldwide (WHO, 2009). It is estimated that tobacco use kills more than 5 million people annually, and it is well documented that tobacco is the main cause of premature death in developed countries (WHO, 2012). Recent statistics indicate that one Canadian dies every 11 minutes from tobacco use (Health Canada, 2010). In 2012, there were 2.46 million tobacco users in Ontario representing 22% (18% were current smokers) of the province's total population (Ontario Tobacco Research Unit [OTRU], 2014). Tobacco consumption has also been linked to many health issues. Various types of cancers, heart disease, stroke, emphysema, chronic obstructive pulmonary disease, osteoporosis, and diabetes are among the causes of premature death related to tobacco use (Mackay & Eriksen, 2002).

Along with tobacco use, physical inactivity is also among the five leading global causes of mortality among all income groups (WHO, 2009). According to Health Canada, physical activity improves overall health; it reduces stress, strengthens the heart and lungs, and increases energy levels (Health Canada, 2011). Recent studies have suggested that being physically active may (a) increase attempts at smoking cessation (deRuiter & Faulkner, 2006), and (b) reduce mortality and morbidity among current smokers (Ferrucci et al., 1999; Garcia-Amyerich, Lang, Benet, Schnohr & Anto, 2007; Mahibir et al., 2004; Manson et al., 2002).

The main objective of tobacco control is to increase cessation among smokers (Smoke-Free Ontario [SFO] Scientific Advisory Committee [SAC], 2010). In the past year, 43% all current smokers in Ontario made a quit attempt (OTRU, 2014). Although typical smokers are open to the idea of cessation, many smokers are unable to overcome the physiological and behavioural addictions linked with tobacco consumption (Bolliger, 2000). Researchers have confirmed that approximately 23% of Canadian smokers participate in recommended amounts of leisure time physical activity (deRuiter, Faulkner, Cairney, & Veldhuizen, 2008) and that physical activity interventions can increase rates of successful cessation (Prapavessis et al., 2007). For instance, Prapavessis and colleagues (2007) found that exercise combined with nicotine replacement therapy facilitates smoking cessation, improves functional exercise capacity, and delays weight gain. There is also strong evidence to suggest exercise as an effective aid for reducing tobacco withdrawal and cravings (Ussher, Taylor, & Faulkner, 2012). Thus, in the context of providing smokers with programs to help them quit, there is evidence that physical activity interventions merit consideration.

Furthermore, ongoing consideration has been given to developing harm reduction-strategies for smokers who are unable to quit (deRuiter & Faulkner, 2006). A product is harm reducing "if it lowers total tobacco-related mortality and morbidity even though use of that product may involve continued exposure to tobacco-related toxicants" (Stratton, Shetty, Wallace, & Bondurant, 2001, p. 198). To date, tobacco harm-reduction strategies have focused on reducing tobacco-related harm through innovative tobacco products, medications, and reduced consumption (Hatsukami, Henningfield, & Kotlyer, 2004; Shiffman et al., 2002).

More recently, several studies have found that being physically active mitigates the long-term negative effects of smoking (Ferrucci et al., 1999; Garcia-Amyerich et al., 2007; Mahibir et al., 2004; Manson et al., 2002). Moderate to high levels of regular physical activity (e.g., light physical activity 2–4 hours per week to vigorous activity of any frequency) are associated with reduced lung function decline and reduced risk of chronic obstructive pulmonary disease among smokers (Garcia-Amyerich et al., 2007). Pulmonary disease is a leading cause of morbidity, mortality, and health care expenditures worldwide (Chapman et al., 2006). Physical activity may help to increase lung function for former smokers by reducing the health burden of smoking (Westmaas & Brandon, 2004). In addition, epidemiological evidence has suggested that physically active smokers live longer than inactive smokers (Blair et al., 1989; Myers et al., 2002; Paffenbarger, Hyde, Wing, & Hsieh, 1986). The principles of harm reduction and the exposure reduction approach are used as a guideline for harm-reduction programs. According to Hatsukami and colleagues (2004), the primary objective of harm reduction is to reduce the occurrence of tobacco-related morbidity and mortality related to the use of tobacco products in smokers who are unwilling or unable to quit. Relevant to the current paper, Hatsukami et al. (2004) affirms that a harm-reduction strategy, among other elements, should not contribute to nicotine dependence, should not reduce the chances of eventually quitting, and should not lead to increased tobacco dependence. Previously, nicotine replacement therapy was the only strategy considered to fill these obligations (Hatsukami et al., 2004). deRuiter and Faulkner (2006) recently provided an extensive review of the literature to argue that physical activity should receive consideration as a harm-reduction strategy for smokers. The authors argue that physical activity at least partially meets the requirements to be considered an effective harm-reduction strategy. Specifically, they provided empirical evidence to support that being physically active can delay the occurrence of disease in smokers, being physically active does not appear to further contribute to nicotine dependence or reduce the likelihood of eventual cessation, and it has the potential to bring about lifestyle changes that allow smokers to be tobacco and nicotine free (deRuiter & Faulkner, 2006).

The purpose of this study was to understand the viability of physical activity as a cessation tool and as a potentially effective harm-reduction strategy. We were specifically interested in exploring the question, "How do smokers perceive that physical activity affects their smoking behaviour?" While there is an abundance of research that has explored the association between physical activity and smoking behaviour (Kaczynski, Manske, Mannell, & Grewal, 2008; Kaczynski, Mannell, & Manske, 2008), much remains to be known in this area of research. To date, most studies that have explored the co-occurrence of physical activity and smoking have done so predominantly using quantitative methodologies. This paper expands our understanding in this area of inquiry by applying a qualitative methodological approach.

Methods

Participants

Physically active smokers aged 20 to 35 residing in a northern Ontario city were recruited for this study through word of mouth and snowball sampling. The range-of-age inclusion was narrowed to enhance the homogeneity of the respondent group. This specific age group was selected because it a) is the second largest age group of smokers in Canada (Statistics Canada, 2009a), b) has the lowest rate of quitting, and c) participates the most in regular physical activity (Statistics Canada, 2009b). "Physically active" respondents were classified according to their degree of activity using Godin's Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985). Self-reported typical weekly frequencies of *strenuous, moderate,* and *light* activities were multiplied by their estimated value in Metabolic Equivalent [METs]. Physically active respondents were included in the study if they expended more than 38 METs per week for men, and more than 35 METs per week for women (Jacobs, Ainsworth, Hartman & Leon, 1993). These values are approximately 2,000 kilocalories of energy expenditure per week (Bengoechea, Spence, & McGannon, 2005). Such values have been associated with reduced risks of heart disease (Paffenbarger et al., 1986). Furthermore, these cut-points have been used in several other studies (Paffenbarger et al., 1986; Jacobs et al., 1993; Bengoechea et al., 2005). "Daily smokers" were defined as those who currently smoke cigarettes every day based on a Canadian Community Health Survey (CCHS) (Statistics Canada, 2009c). All respondents smoked a minimum of one cigarette per day. Each participant was briefed on the study and signed an informed consent.

Data Collection

Individual semi-structured interviews were conducted in private with each of the 12 participants, using a semi-structured interview guide (See Appendix A). The interviews were audio recorded and transcribed verbatim following the

interview. A confirmatory focus group was held with six of the same 12 participants for follow-up discussion on the categories that were identified from the individual interviews. All respondents were invited to participate in the focus group.

Data Analysis

The steps recommended by Berg (2009) were followed for the analyses. This included a) segmenting the text into meaning units (MUs); b) sorting the MUs by category, identifying patterns and commonalities; c) examining the sorted data to isolate meaningful patterns; and d) identifying patterns and generalizing overall themes that relate specifically to the research question. This analysis procedure was supported by qualitative data analysis software, QSR NVivo version 8 © (NVivo qualitative data analysis software, 2008). All respondents were given the opportunity to review their transcripts prior to analysis as well as participate in a follow-up focus group in order to confirm the results. The study was approved by the authors' institutional Research Ethics Board.

Results

The respondent group included 12 participants from the northern part of the province of Ontario in Canada. Six of the 12 interviewees participated in the confirmatory focus group to verify and discuss the themes that were identified from the individual interviews. The respondents included six men and six women with a mean age of 28. The average years smoking was 11, with respondents reporting smoking 5 to 25 cigarettes per day. Their self-reported physical activity levels ranged from 40 to 100 METs per week based on Godin's Leisure-Time Exercise questionnaire. The types of physical activity the respondents participated in included a variety of group sports such as hockey, slow-pitch baseball, golf, volleyball, and individual types of activities such as jogging, weight training, walking, or biking.

A total of 562 Meaning Units (MUs) were identified from the interview and focus group transcriptions. Upon further analysis, 340 MUs were retained as being directly related to the purpose of this study. Physical activity does appear to influence smoking behaviour; however, the positive or negative influence depends on (a) the type (162 MUs) and (b) context (178 MUs) of the physical activity. Two aspects of the "type of activity" were identified as important: (1) the intensity of the activity (129 MUs), and (2) the perceived activity competiveness (33 MUs). Two aspects of the "context of activity" were identified as important: (1) the level of activity socialization (103 MUs), and (2) the location of the activity (75 MUs).

Type of Physical Activity

Intensity of activity. Several participants suggested that the way their body physiologically responded to physical activity had a positive influence on their smoking patterns. For instance, one respondent shared her experience on how physical activity helped to prevent cigarette use:

> When I hit the ball into the outfield for an in-the-park home run and I get back to the bench, it takes me forever to catch my breath. It's an eye opener. It definitely works in a positive way for me (Respondent 3, Female, 24, Semi-Structured Interviews [SSI]).

Specifically, physical activities of a vigorous nature provided some respondents with a much-needed reminder of the negative physiological consequences of smoking.

Another example of how the physiological response of physical activity could decrease nicotine dependence and tobacco consumption was provided by a male respondent who spoke of the feeling of discomfort during high intensity physical activity, alluding to the fact that his body may have responded better to the activity if he were not a smoker:

> Some days you are doing everything you can just to catch your breath, your heart is racing, you can feel your blood pressure rising, you know there's some definitely not so nice effects to it. I get headaches sometimes… (Respondent 4, Male, 24, Semi-Structured Interview [SSI]).

These findings support the notion that being physically active reveals the negative physiological consequences of smoking. However, respondents expressed this primarily when speaking of high intensity activities, for example:

> …during intense sports, you really feel it. When you are playing slow-pitch or just pick-up basketball, you are not running full out, so it doesn't affect you, but you do notice that you are sweating a lot more than somebody that doesn't smoke cause your body is working twice as hard now (Respondent 1, Male, 32, SSI).

In addition to the physical reminder of the negative effects of smoking, being physically active appeared to create awareness and perhaps provide motivation to quit. Some respondents spoke of reduced patterns of tobacco consumption as a result of being physically active in high-intensity situations:

> I think by changing up your routine with adding physical activity to your day, I think would help with reducing smoking. I do smoke a lot at baseball, but I wouldn't really consider it a strenuous activity. So, by adding running to your day, and you know, more exercise, I think it would slow down the smoking (Respondent 4, Male, 24, SSI).

The findings described above provide some indication that physical activity can support smoking cessation; however, clearly individual differences are present. Furthermore, certain factors such as the intensity of the activity need to be considered in order to make such assumptions. During the focus group discussion, the respondents reiterated what were found during the interviews. The respondents confirmed that when they participated in high-intensity physical activity, it decreased their desire to smoke.

However, the physiological response to physical activity could also increase nicotine dependence and therefore tobacco consumption. For example, if a non-physically active smoker begins an exercise program, the participant might be less likely to succeed if the exercise is too vigorous because the participant might feel winded or out of breath. This respondent shared an example of how the smokers' perception of the physiological response to physical activity could also increase nicotine dependence among physically active smokers:

> After physical activity, for example going for a run, you are huffing and puffing and breathing deep because you're running, and sometimes, you think, I want to have a smoke right now, to calm myself down (Respondent 6, Male, 29, SSI).

As such, what is clear is that physically active smokers spoke of an increased physiological awareness as a result of being active. However, how this translates into a positive or negative outcome depends on individual perception.

Perceived activity competitiveness. A by-product from being active that seemed to clearly manifest itself differently depending on the individual and the type of activity was the role of competitive sport. In certain physical activities, namely organized sport, the competitiveness of the situation seemed to influence tobacco consumption patterns. Throughout the semi-structured interviews, as well as the confirmatory focus group, participants spoke of these types of competitive circumstances; however, there was a contradiction as to whether it was beneficial or harmful.

For instance, this 32-year-old male respondent provided an example of competitive stress from physical activity that actually increased the likelihood of tobacco consumption:

> As the game goes on and you're really into it, that's when I find myself craving one. Ever since I can remember, like you get into tense moments, and it just seems like the first thing you reach for is a cigarette (Respondent 1, Male, 32, SSI).

The stress seems to be a driver for some athletes in highly competitive situations. For this participant, smoking may act as a coping mechanism under competitive circumstances.

In contrast, other respondents expressed that the "competitiveness" or "stress" experienced during sport provided an interruption from cigarettes. For instance, this 26-year-old female speaks to the importance of being "in the game," saying, "You're there to play ball, you're focused, and you're into the game. You don't even think about smoking" (Respondent 10, Female, 26, SSI). For many of the respondents, participating in competitive sport and participating in high-intensity physical activity acted as a distraction from smoking. Again, however, individual variability was clearly present.

Context of the Activity

Level of activity socialization. Socialization and the recreational aspects of being active outdoors seemed to increase cigarette consumption. There were several meaning units that were identified during many of the discussions with the participants regarding the influence of socialization. Respondent 1, a 32-year-old male, possibly best exemplified this association:

> It's almost like when you yawn, you make the other person yawn, and you see someone lighting a cigarette, all of a sudden you are reaching in your pocket and you are like, I better have one, too. Don't want to let them smoke alone (Respondent 1, Male, 32, SSI).

Most participants described the feeling of being socially influenced to have a cigarette while being physically active, particularly in situations where smoking was permitted during the activity. Another example of this is expressed by a respondent stating;

> If I stayed home every day and did nothing and never left my house, I wouldn't smoke, because I don't smoke in the house. I don't like smoking by myself because that's boring. You have no one to talk to; you are just sitting there smoking. I'm pretty sure if I did not play sports, I wouldn't smoke (Respondent 8, Female, 28, SSI).

In general, most respondents described how activities of a 'recreational' nature increased their likelihood to smoke. Furthermore, this tendency was generally expressed when they were participating in activities where other teammates or partners were also smokers. For example:

> It all depends, if I play baseball on a team where nobody on the team smokes, I probably won't smoke. I am not going to leave the bench to go have a smoke, because no one else is smoking (Respondent 7, Female, 29, Focus Group [FG]).

This reaffirms the influence of socialization on cigarette consumption for certain participants.

Activity location. The focus group participants indicated that smoking policies could have a positive impact on smoking patterns and behaviours

during physical activities. One respondent described how she would react to smoke-free baseball fields, saying, "If you can't smoke, I'm not going to step away from the game to go for a smoke, if I am at the game, then I'm on the bench. If I can have one there I will, but if there is a ban in place and I can't, I won't" (Respondent 7, Female, 29, [FG]).

Regarding the issue of policy and smoke-free outdoor spaces, the group discussed that enforcement would be needed to affect change.

All respondents described the negative influence of certain aspects of being physically active throughout the semi-structured interviews and focus group. Participants felt that they had a greater desire to smoke, and in some cases increased their consumption of cigarettes, when participating in recreational, social-type physical activities. For example, this respondent clearly expressed how sport is detrimental to the likelihood of her negating her smoking behaviour: "If I'm sitting an inning (on the bench at baseball), I'm probably going to have a smoke… and if I don't finish it, and I'm going up to bat, I'll just pass it to someone on my team or if they are going up to bat, they will give me the smoke" (Respondent 7, Female, 29, [FG]).

Conversely, when they were put in a situation that prevented them from smoking, such as being indoors, being in a smoke-free outdoor environment or participating in a sport where social smoking did not appear to be prevalent, it acted as a distraction for the participants.

Discussion

The overarching finding in this study is that physical activity has an influence on smoking behaviour and is mediated by a) the type of activity, and b) the context of the activity. However, the findings within this study suggest that the way physical activity influences smoking patterns is highly individualized. In general, if we are to use physical activity to promote harm reduction and eventual cessation, it appears that we need to focus on promoting physical activity of higher intensity nature. Higher intensity activities were mostly associated with a reduction of cigarette consumption, and more frequently, high-intensity activities also made participants aware of the negative physiological effects of smoking. For the most part, low-intensity recreational type activities led to an increased consumption of cigarettes and therefore were not helpful. Specifically, socially oriented outdoor activities appeared to increase cigarette consumption. As such, the influence of being physically active on smoking patterns appears to be mediated by additional elements—mainly the type of activity and the circumstance under which the activity is occurring.

Two main points merit further discussion. First, most respondents felt that being physically active provided a distraction that led to reduced cigarette consumption, and second, respondents felt that in more social physical activities where others were smoking, it would actually increase their likelihood of smoking. These two findings will be discussed in further detail.

First, to highlight that physical activity may be considered a distraction, a study of health care professionals suggested that physical activity helped clients to self-regulate cravings and withdrawal symptoms, which helped clients to feel in better control of their smoking patterns (Taylor, Everson-Hock, & Ussher, 2010). Similar findings were discussed during this study's confirmatory focus group. Respondents felt that the vigor of being physically active increased their awareness of their body and how it was reacting to the exercise. It is important for respondents to acknowledge these physiological responses. In many cases, being active reminded them how much their aerobic capacity had been affected by their daily tobacco consumption. Supporting smokers to participate in individual physical activities seems to have a positive effect on their smoking behaviour. Respondents found that when they were engaged in high-intensity individual activities, thoughts of smoking were suppressed. Physical activity in contrast to stress has been found to draw out feelings of health and energy (Moraska & Fleshner, 2001). Studies have also shown that moderate physical activity levels can alleviate emotional stress (Eliot, Forker, & Robertson, 1976). Furthermore, Norris, Carroll, and Cochrane (1992) looked at the effects of physical activity and exercise training on personal stress and well-being in adolescents, and found that when participants are undergoing higher levels of physical activity interventions, they reported significantly less stress levels than those using lower levels of physical activity. However, there were exceptions. Some respondents alluded to certain competitive stress situations and how when they felt tense or anxious during sport they would reach for a cigarette to "calm their nerves." This information is useful for persons who are using physical activity as a way to cope with non-exercise-related stress throughout the cessation process. If the competitiveness of sport is increasing their likelihood of reaching for a cigarette to cope with such stressors, it is important for the smoker to acknowledge this trigger, and the smoker want to consider either engaging in non-competitive sport or using alternative methods of stress management.

Second, smoking in social situations increases in adolescence and then declines during adulthood (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997). Further, a recent study also noted that adolescence smoking behaviour can be linked to social anxiety and gaining social confidence during adolescents (Watson, VanderVeen, Cohen, DeMarree, & Morrell, 2012). Researchers have also found that smoking behaviour and physical activity are negatively associated when smokers participated in a sport that usually has a strong social component (Kaczynski, Manske, Mannell, et al., 2008). However, in this study, when smokers participated in a recreational group sport, they were more likely to smoke because of the social influence of teammates. This social context was discussed at length during the individual interviews, as well as during the confirmatory focus group. All participants agreed that socializing

with a cigarette was a key similarity in their respective physical activities. There would appear to be the presence of "a smoking culture" associated with certain sports (e.g., baseball, golf). Gauthier, Snelling, and King (2012) recommended that smokers participate in recreational activities based on a higher likelihood of engaging in physical activity; however, according to the participants within this study, participating in recreational situations where smoking is permitted, they were actually more likely to smoke.

As a result the findings within this study, we offer two specific recommendations. First, we recommend that municipal policies or bylaws enforce smoke-free outdoor spaces. It would be encouraging for physically active smokers to refrain from smoking while at recreational outdoor facilities if smoking were prohibited. According to Hammond, McDonald, Fong, Brown, and Cameron, (2004), 38% of former smokers expressed that smoke-free policies helped them to abstain.

Second, we also recommend promoting outdoor activities where smoking is not part of the "culture" of the activity. These types of activity would ensure that smoking during physical activity is more difficult and less accepted. It would also be beneficial to recognize activity-related triggers and contexts in which athletes who smoke are most likely to smoke. Once triggers are identified, individuals and health care providers can be mindful of their behaviours and use strategies to overcome these situations.

Limitations

Despite the important contribution this study makes to this body of literature, the study has some limitations that prevent its generalizability. First, the sample is relatively narrow in scope, therefore results can only be transferred to physically active athletes between the ages of 20 and 35. Second, the respondents had established physical activity routines, so the study does not speak to the promotion of physical activity to non-active smokers. Third, all of the respondents were from the same geographic area, where smoking is quite prevalent. The participants expressed an apparent belief that smoking is the social norm among northern Ontarians. According to North East Local Health Integration Network data (2008), smoking in northern Ontario is more prevalent (25.6% smokers) than the provincial average (20.7% smokers), and northern Ontario residents are less likely (67.7%) to ask others to refrain from smoking than their counterparts in other areas of the province (72.5%). Furthermore, when the current study was conducted, municipal by-laws in the city did not prevent outdoor smoking (*Note:* Since the study, the city implemented a smoke-free by law on recreational facilities, playgrounds, and beaches). Thus, future studies should consider speaking with non-active smokers, considering a wider range of age within their sample, and explore if any geographical variations are present.

Conclusion

Physical activity should be used as a health-promotion strategy for smokers, but only under specific circumstances. High-intensity physical activity seems to provide a distraction from smoking and is also a reminder of the negative physiological effects of cigarette consumption. However, caution is warranted as in certain contexts (i.e., low-intensity sport) the physical activity might actually serve as a vehicle to increase cigarette consumption by way of socialization. Therefore, it is recommended that physically active smokers engage in high-intensity outdoor and any types of indoor activities (i.e., yoga, volleyball) that do not facilitate smoking. Consideration for the most appropriate intensity depending on the individual's level of fitness and the context of the suggested activity need to be considered. It is also important for smokers themselves to be aware of their personal triggers that incite smoking in order to facilitate the cessation process. As such, we encourage all health professionals to carefully consider integrating tailored physical activity programs into their tobacco cessation initiatives.

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Appendix A

Semi-structured Interview Guide

1. When did you first start smoking? Can you tell me about that experience?
2. Can you recall what or who influenced you to start smoking?
3. Have you always been physically active?
4. Were you more or less active prior to when you started smoking?
5. Do you think if you quit smoking that you would be more or less active?
6. Do you smoke while you are physically active? For instance, do you smoke while you golf or play baseball?
7. What types of physical activities do you participate in?
8. Do you think smoking socially isolates you from others you are active with or are you active with others who smoke?
9. When and where do you smoke the most?
10. Do you think being physically activite affects your smoking behaviour in any way?
11. Do you want to quit smoking?
12. Have you ever tried to quit smoking?
13. What is preventing you from quitting?

14. Do you think being physically active supports or hinders your desire or attempts to quit?
15. What challenges have you faced when trying to quit?
16. What challenges do you face in being physically active; how have you overcome these challenges?