

# ***Workplace Implications for Female Leaders: Exploration of Stereotype Threat within Video Conferencing.***

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## **Abstract.**

A significant body of research has documented the effect to which stereotype threat can be triggered by both the physical environment and by the use of various technology media. However, there is a dearth of research exploring the relationship between stereotype threat, defined here as “*the concrete, real-time threat of being judged and treated poorly in settings where a negative stereotype about one’s group applies*” (Steele, Spencer & Aronson, 2002, p.385), and video conferencing software features - specifically virtual backgrounds. This literature review suggested that this feature might, in certain circumstances, negatively affect the performance of groups not stereotypically associated with leadership roles. The review considered the use of video conferencing virtual backgrounds in order to discern if background images evoking gendered stereotypes of leadership can cue stereotype threat in female technology workers undertaking a leadership activity, thus negatively effecting performance. The review examined the relationship between performance on the leadership activity and exposure to gendered backgrounds on a video conference call, and the findings are applicable across organizations and higher education (HE) contexts. From this study situated in organizational workplaces, it can be argued that the issue of stereotype threat due to virtual backgrounds is also likely to exist in higher education contexts. Particularly since across many HE disciplines, instructors have adopted the use of video in instructional settings including face-to-face classrooms, blended learning environments, and online courses. Recommendations from the systematic literature review were provided for corporations and management professionals and can be extended to higher education institutions, with suggested amendments to support improved staff training and professional development outcomes.

**Keywords:** Female leaders; Higher Education; HRM; Leadership performance; Organisations; Stereotype threat; Video Conferencing Software.

## 1. Introduction.

In an increasingly competitive global environment, commercial organisations constantly strive to boost performance. Companies believe that by diversifying their staff, increased creativity and better decision-making can be achieved which will result in competitive advantage (Simons, Pelled & Smith, 1999; Hunt, et al., 2015; Stahl, 2021). In this context, organisations aim to develop their staff, by making considerable investments in workplace diversity initiatives. Equally, in a competitive HE environment, studies have explored female leadership in HE and the issue of stereotype threat (Hoeritz, 2013).

There is evidence of the positive value of a diverse workforce to organisations, with a number of studies indicating that companies who deliberately establish heterogeneous teams are the most innovative (Kanter, 1983). It was also found that teams including minority members often produce more creative solutions when presented with a problem compared to homogeneous teams (Nemeth, 1986). Diversity has been shown to have a positive influence on leadership teams also, bettering decision-making (Simons et al., 1999). It is important then, to preserve and promote diversity at managerial levels, and minimise any impediments to this goal. One such impediment is stereotype threat. An interesting study by Casad & Bryant (2016) discuss how researchers have debated the relevance of stereotype threat to the workplace, and how it can reduce domain identification, job engagement, career aspirations, and receptivity to feedback. They posit that stereotype threat has consequences in other relevant domains including leadership, entrepreneurship, negotiations, and competitiveness, and we argue for HE contexts also.

### 1.1 Rationale for the Study.

Stereotype threat is defined as a type of identity threat experienced when a group member perceives the possibility of being judged or treated poorly in settings where a negative stereotype about that group applies (Steele et al., 2002). In recent years, the practical implication of this predicament for organisations has been studied (Davies et al., 2005; Hoyt & Murphy, 2016; von Hippel et al., 2011). This is because stereotype threat has consequences in many workplace domains including leadership ability, entrepreneurship, negotiation ability, and competitiveness. Research on the physical environments of conference halls and workplace offices have been analysed for situational cues which may trigger stereotype threat to the detriment of the workers within (Cheryan et al., 2009; Murphy et al., 2007). Practical recourse

on how to combat the pernicious effects of the threat have also been documented (Cortland & Kinias, 2019; Hoyt & Murphy, 2016). However, since the pandemic of 2020 and the rise of video conferencing software as the primary means of collaboration for many organisations, no research has been conducted on video conferencing software features such as virtual backgrounds. More research is required to determine if this feature cues stereotype threat in much the same way as physical environments have been shown to. If so, working from home may disproportionately affect the performance of minority groups in a negative capacity, across organisational and higher education contexts.

### **1.1.1 Stereotype Threat and Leadership.**

A common issue of concern among today's technology organisations relating to diversity is the lack of women in leadership roles. Research has shown that both racial and gender diversity in leadership positions positively influences organisation performance (Carter et al., 2003; Erhardt et al., 2003; Ferrary & Déo, 2022). It has also been shown that women tend to adopt different leadership styles to men, which are particularly appropriate for navigating the complexity of modern organisations (Eagly & Carli, 2003). It can therefore be posited that an increase in female leaders in a firm with predominantly male leadership will lead to increased gender diversity, which in turn will lead to better decision making and innovation (Lorenzo et al., 2018; Simons, Pelled & Smith, 1999), which could then result in increased profits for the organisation. Similarly, in a HE context, Johnson (2023) argues that stabilizing and empowering women in higher education is essential in promoting gender equality and generational social progress.

The lack of female leadership in organisations has been discussed at length over a number of years (Acker, 2004; Galsanjigmed & Sekiguchi, 2023). Science, technology, engineering, and mathematics (STEM) disciplines tend to be viewed as traditionally masculine domains where women face barriers such as gender bias and discrimination (Von Hippel et al., 2011). In the context of this systematic review, related to gender bias is a phenomenon known as stereotype threat.

Stereotype threat occurs when a negative stereotype regarding a group under test becomes salient in the context of that test, adversely affecting the performance of the subject (Steele & Aronson, 1995). For example, as posited by Cadinu et al. (2005), if a stereotype that a group with which the subject identifies is unskilled in mathematics becomes salient in a testing situation, the fear of performing poorly in said mathematics test and conforming to that negative stereotype will divert the subjects' attention onto task-irrelevant worries; this can induce anxiety,

reduce working memory and result in poor performance. If the stereotype is not made salient, however, no drop in performance is observed. The body of research conducted on stereotype threat has grown rapidly since 1995 when Claude M. Steele and Joshua Aronson published their seminal study on African Americans and bias in standardised testing. Since then, the theory has expanded to other domains and stereotyped groups including mathematical ability in women, athletic ability in White men, and many more. For example, in a meta-analysis, Doyle & Voyer (2016) found a significant effect of stereotype threat on the performance of women on a variety of mathematical tasks using a sample of 133 relevant articles, and Kahalon et al. (2020) report that for women, stereotype threat effects can manifest in various domains (e.g., driving; yet the vast majority of research has focused on math performance).

Research has also shown that people have preconceived notions of what it means to be a leader, and these often include being White and being male. This can result in biased perceptions and evaluations of people who do not fit the preconceived image of a leader (Koenig et al., 2011). These stereotype-based expectations of inferiority can be problematic to women's careers and can contribute to a shortage of female leaders (Block et al., 2011). Short-term exposure to such a threat can result in avoidance of duties or tasks where the threat will be experienced. Chronic exposure could result in dis-identification with the entire profession, leaving fewer women to assume leadership roles in the future (Hoyt & Murphy, 2016).

Since the pandemic began at the start of 2020, the physical environment people now work in has changed, with many organisations asking their staff to work from home. Initially this was an effort to '*flatten the curve*' of positive pandemic cases and prevent health systems around the world from being overwhelmed (Saez et al., 2020). As time went on this became the norm, with government policies recommending only essential workers physically attend their work places. While this may have reduced the extent to which physical environments can trigger stereotype threat, it may have introduced a new environment in which these triggers can occur: video conferencing.

During the pandemic, a video conferencing company named Zoom emerged as the leading provider in the technology and its adoption as the tool of choice for communicating within companies as well as at home was dramatic (Bennett & Grant, 2020). In a study by Doush et al. (2022) on the learning features of video conferencing software based on Universal Design for Learning guidelines, the results prove that *Zoom* is more accessible than *MS Teams* and *Google Meet*. Although there are many video conferencing systems available on the market, for

this research study, *Zoom* was the primary technology examined. The main reason for this are its prevalence in the business world since March 2020.

In December 2019, *Zoom* had 10 million daily users. By March 2020, that figure had jumped to 200 million. In April 2020, that number jumped another 50% to over 300 million daily users (Iqbal, 2021) and between January 2020 and the middle of March 2020 alone, in the midst of the pandemic, usage of *Zoom* increased by 67% (Novet, 2020). While some of this usage can be attributed to personal use and educational use (*Zoom* was used by 90,000 schools across 20 countries during the pandemic), business use also increased dramatically. *Zoom* now has 467,100 business customers with more than 10 employees and during 2020, *Zoom*'s business customer base grew by 470%. Perhaps even more significantly, to "*Zoom*" someone became a verb (Davenport, 2020). In essence, *Zoom* became the new work environment while collaborating.

If stereotype threat could be triggered in the old '*physical*' work environment, what about this new virtual world of work? Could changing the virtual environment in which we collaborate to display something that could be perceived as '*unwelcoming*' cue stereotype threat and influence the performance of those around us in an as-yet unstudied negative way? If so, there could be incentive for the business customers of *Zoom* to disable personalised virtual backgrounds in favour of neutral ones for the benefit of marginalised groups and minorities which may not conform to traditional western views of leadership.

## 1.2 Aim of the Systematic Review.

The aim was to address a gap in the existing body of literature on stereotype threat and explore how this concept translates into practice in today's corporate landscape.

This was important to know in order to be able to establish if the stereotype of leadership is still felt today among female leaders and to gain a deeper understanding of their lived experience of the phenomenon. This is to ascertain the effects of stereotype threat on several female leaders in a multinational technology organisation over time. Together, these aims can contribute to the body of research on contextual factors that affect gender stereotype threat in female leadership roles in a corporate organisation. This study is significant in validating previous research on stereotype threat, addressing research gaps and in providing useful insights to IT and HR professionals and organisations so they may facilitate meaningful support

of employees in future training and leadership programmes.

### **1.3 Context and Scope of Study.**

As indicated, there are many video conferencing solutions on the market. However, the most popular collaboration tool of the new hybrid work environment has emerged to be the video conferencing application Zoom, which was used in this study. One of the features that video conferencing products offer their customers is the ability to change or blur the background which displays behind the speaker when their video is switched on during a call. The default is to not show any background image and instead simply display the person in their current surroundings. Some companies make generic images available for use as a virtual background, often with the company logo on it. These can be used as backgrounds for people who do not wish to show their homes on camera, or if they are working from a non-traditional space. Additionally, some people have personalised their background image to be something that appeals to them or that has a personal or special meaning. If these background images are ill-chosen, it can be theorised that stereotype threat could be cued, similar to how it can be cued in physical environments and, over time, a loss of minority or female leaders could occur.

## **2. Literature Review.**

In order to make the case for the lack of literature in relation to video conferencing, a systematic review was undertaken and the next section of the paper outlines the methodology, addressing the search terms used, the databases and journals that were searched, the criteria used for the searches and the criteria for including the papers reviewed. It also briefly outlines the key categories emerging from the search.

### **2.1 Methodology.**

Twenty-six articles were systematically reviewed, investigating the practical implications of stereotype threat on organisations. These practical implications were then gathered from the research, including key areas of focus for organisations and universities who wish to provide an identity-safe environment for their employees. Within this, specifically the physical environment, solo status and minority representation, and technologies were explored.

This literature review utilised the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (PRISMA) to transparently report why this review was carried out, how the

literature was sourced, and what the findings were.

A systematic literature review (SLR) is a structured analysis of research on a topic of interest focused around a practical question or problem. It is therefore key that the precise question or problem be clearly identified and explicitly noted. The PICOC mnemonic (Population, Intervention, Comparison, Outcome, Context) outlined in Table 1 helps to structure the problem under investigation by identifying the variables that make up the question to be answered. PICOC is also useful as a tool to remember the components of the problem. It is often the first step in evidence-based practice to formulate a searchable research question by helping to develop key terms. Using the PICOC method with the detail below, a primary literature review question was formulated as part of the scoping of the study: *“Is there a gap in the literature concerning stereotype threat activation via gendered virtual backgrounds present in video conferencing software?”*

**Table 1: PICOC analysis of the problem**

<b>Population</b>	Who?	Staff who may experience stereotype threat in their day-to-day work environments, physical or virtual, particularly female leaders.
<b>Intervention</b>	What or How?	These staff may experience stereotype threat when exposed to situational cues present in workplace settings, physical or virtual.
<b>Comparison</b>	Compared to what?	Identity-safe environments and settings.
<b>Outcome</b>	What are you trying to accomplish, improve, or change?	Mitigate the risk of stereotype threat, creating identity safe work environments, leading to increased numbers of female leaders, resulting in increased organisation performance.
<b>Context</b>	In what kind of circumstances?	Organisations whose primary means of collaboration have shifted from physical to virtual is the wake of the 2020 pandemic.

## 2.2 Inclusion and Exclusion Criteria.

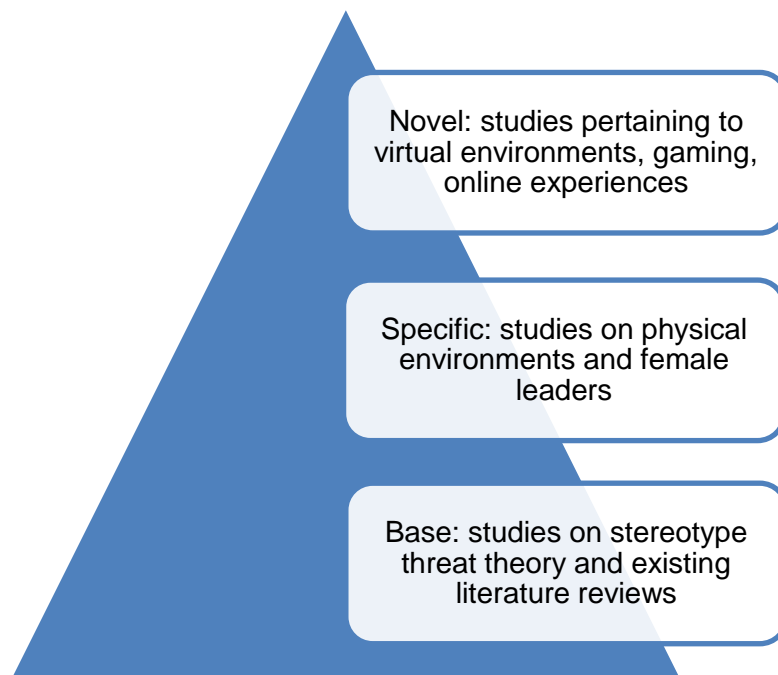
The SLR focussed on a niche and novel area of stereotype threat. The SLR articles were

grouped into three 'layers' of research, moving from 'base' to 'specific' to 'novel', as shown in Figure 1. The eligibility criteria were then adjusted for each layer of the SLR.

Base articles are highly cited core studies on the theory of stereotype threat. Specific articles narrow this focus to look more closely at the practical applications of the theory in workplace settings. The Novel layer contains some of the most recent research relating stereotype threat to modern technologies such as virtual reality classrooms and video game avatars. A pyramid diagram was chosen to reflect the amount of articles reviewed at each layer. In total, 11 base articles, 8 specific articles, and 7 novel articles were synthesised.

Inclusion criteria are used to discern whether or not a study should be included in the SLR. Several factors were taken into consideration when establishing the academic inclusion criteria for this SLR. Some factors which influenced the criteria from the outset were the Academic Journal Guide (AJG) rating, the number of times the paper has been referenced by other papers (citation count), and the date of the paper.

**Figure 1: Three layers of research: Base, Specific, and Novel.**



The AJG is a guide to the quality of journals in business and management education research. The AJG ranks journals on a scale from 1 to 4\*, with 4\* being the highest grade achievable. Citation count can also be indicative of the influence of a particular study. There is an ongoing debate as to whether citation count indicates impact rather than quality (Leydesdorff et al.,



2016). Extra care therefore was taken to ensure the citation count reflected influence rather than controversial or disproven theories via author bibliography reviews. Finally, the date selected was 1995 onwards, to match the intervention of our PICOC question, being stereotype threat, first researched by Steel & Aronson (1995) in the same year. The eligibility criteria for this SLR can be seen in Table 2 for the base layer.

For the Specific and Novel layers, a “*handpicking*” method was used based upon the themes of the two layers (physical environments, female leaders and role models, and virtual environments). While the Specific layer was still held to the inclusion criteria in Table 2 where possible, this was not the case for the Novel layer, where some articles were selected from journals not listed in the AJG, and some which were but had as yet garnered few citations.

**Table 2: Literature Review Inclusion Criteria (Base)**

<b>Factor</b>	<b>Measure</b>
Date:	1995 onwards (27 years)
Language:	English
Academic Journal Guide Rating (2021):	AJG ratings of 3, 4, or 4* were preferred at Base layer
Citation Count (as of January, 2022):	Studies with more than 300 citations were preferred at Base and Specific layers
Type of Studies:	Quantitative, empirical studies

Academic exclusion criteria were also identified, chiefly for the Base articles. Clearly, AJG ratings below 3 were deprioritised, such as Cross & Linehan (2006) and Michie & Nelson (2006). Studies with less than 300 citations were also excluded at this layer, except in the case of two studies which were deemed highly relevant upon review of the abstract. In addition, several studies were excluded based on the industry setting (medicine or education rather than technology or industry neutral), and others due to the lack of availability of the full text, despite a promising abstract.

## **2.3 Information Sources.**

The databases below were searched for relevant articles using the search phrases outlined in Table 3. This process was repeated a month later following greater familiarity with the nomenclature (e.g. using “*situational cues*” instead of “*physical environment*”). *Google Scholar*

was first used to evaluate which Journals returned results most consistently, and associated databases were then selected via a HEI Library Services site. A review of the databases available in Library Services showed two related to the APA which were then used in the search for additional literature. This process was repeated several times and the database portals that returned pertinent results are outlined below.

**Table 3: Summary of Databases Searched**

Database Title	Area of Research	Key Journals
SAGE Journals Online Including Deep Backfills	Social Sciences Humanities	Personality and Social Psychology Bulletin Social Psychology and Personality Science Psychology of Women Quarterly Social Psychology Quarterly Feminism & Psychology
ProQuest Central	Social Sciences Technology	International Bibliography of the Social Sciences Social Science Database Sociology Collection
PsycArticles	Psychology	Developmental Psychology Journal of Applied Psychology Archives of Scientific Psychology
PsychINFO	Behavioural Science Mental Health	Journal of Cognitive Psychology European Journal of Psychology Psychological Research
SocINDEX with Full Text	Sociology Social Work	The Journal of Social Psychology Social Behavior and Personality The Journal of Applied Social Psychology

SAGE had its own search page, as did ProQuest, whereas the other three redirected to EBSCOhost with the selected Database set as a search parameter. The variety of databases proved useful as they each had access to different journals which produced a more comprehensive set of articles to synthesise. A 'snowball' search was also conducted to identify additional studies by searching the reference lists of several results, including that of Hoyt & Murphy (2016). This paper was selected as it is a relatively modern literature review of

stereotype threat from a AJG-rated 4 publication (The Leadership Quarterly), with a specific focus on women in leadership.

## 2.4 Search Strategy and Study Selection.

There were cases where the ‘*searched for*’ terms were found in the References sections of returned articles. In some cases, these referenced articles were not found in the search results of that database for those terms. This was mainly the case for the specific and novel layers while searching for terms such as “*virtual*”, “*physical environment*”, or “*video conferencing*”. When this occurred, and the abstract was deemed promising, they were selected for inclusion.

Results from each search were examined for relevance and impact, and duplicates were removed. Abstracts were then read, and again some initially promising articles were discounted; for example Beilock, *et al.*(2007) was rejected for focusing more on the mechanics of working memory than that of stereotype threat itself. Christy & Fox (2014) was rejected also, as the selection process for the study participants was not rigorous. For example, the literature says stereotype threat primarily effects people highly identified with the domain under test. This identification measure should be taken prior to the experiment as part of the participant selection process. However, in this particular paper, the domain identification was taken as part of the experiment on an already-selected group of participants. Perhaps as a result, the findings of this paper were not compelling.

Study selection took place in three phases. The titles of the studies were examined first on the search results screen to see if they were relevant to a core concept of the stereotype threat theory, a professional setting, a novel technology, or the predicament as experienced by female workers. This was necessary to whittle down the numbers from the search results to a manageable size and helped screen a large number of articles from the areas of organisational behaviour, sports science, medicine, education, etc. The next step was to examine the abstracts of the studies that met the professional setting and examine them against inclusion criteria defined for this study.

Finally, a degree of variety was preferred. Rather than select several studies examining performance directly, studies were chosen which tested different aspects of the topic, including psychological effects (e.g. negative thinking), mediating stimuli (e.g. television adverts), and outcomes (e.g. career implications).

## 2.5 Definitions.

Stereotype threat has been defined as “*the concrete, real-time threat of being judged and treated poorly in settings where a negative stereotype about one's group applies*” (Steele et al., 2002, p.385). It is a predicament that can affect members of almost any group about whom negative stereotypes exist. When under stereotype threat, individuals tend to perform worse at tasks that are diagnostic of ability. When this threat is removed, performance levels return to normal.

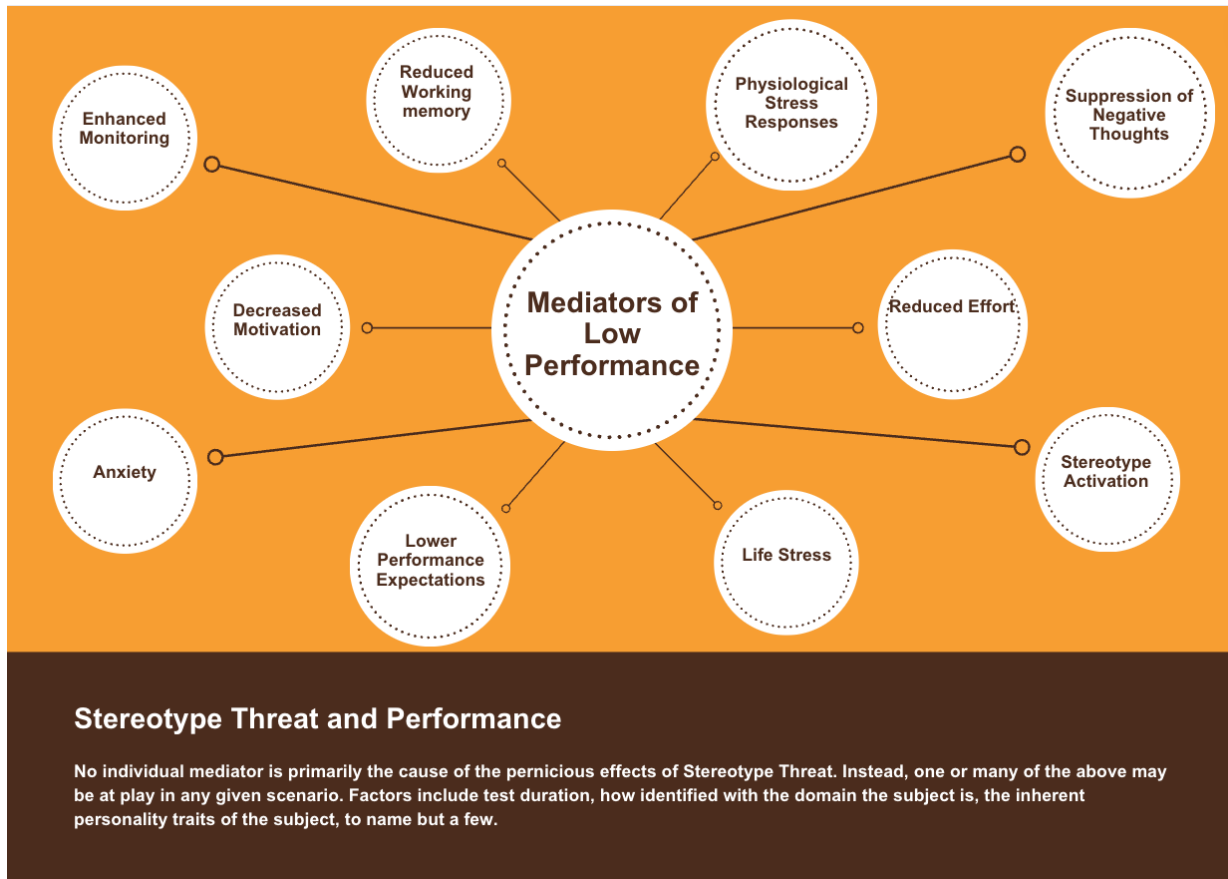
Davies et al. (2005) discussed the conditions that need to be in place in order for stereotype threat to be in effect. Vulnerability to stereotype threat was shown to require individuals having existing knowledge of the relevant stereotypes linked to their stigmatised social identities. Interestingly, they do not need to believe the stereotype is true to be affected by the threat. Bergeron et al. (2006) also discussed conditions that must be present for the phenomenon to take place. First described by Steele (1997), these conditions are:

1. There must be a societal awareness of the negative stereotype of one's group.
2. The individual must closely identify with the relevant domain, or area, in one's life.
3. The negative stereotype of the individual must have relevance in the context of the situation.

## 2.6 Mediators of Low Performance under Stereotype Threat.

The processes through which stereotype threat can lead to performance decrements in those targeted by negative stereotypes are complicated (Schmader et al., 2008). In their review of the literature, Schmader found that stereotypes can reduce performance on cognitive tasks through three specific yet interrelated physiological and psychological processes: physiological stress responses that reduce available working memory, increased monitoring of one's performance, and active suppression of negative thoughts. However, several other mediators have also been identified in other studies. A synopsis of the mediators found across the SLR has been compiled in Figure 2.

Reduced effort has been suggested as a mediator (Steele et al., 2002). The effort people expend while experiencing stereotype threat on standardised tests has been measured in the literature, with results suggesting that for people with weaker domain identification decreased effort might be responsible for stereotype threat's effect on performance

**Figure 2: A synopsis of the mediators of stereotype threat.**

Related to reduced effort is decreased motivation. Stereotype threat has been shown to undermine women's motivation and desire to pursue success within the field through a reduced sense of belonging (Cheryan et al., 2009). Roberson & Kulik (2007) also showed that experiencing stereotype threat results in reduced motivation, performance, and engagement. Steele (1997) also theorised decreased motivation was a mediator. He argued that when stereotypes of ability pervade society, they can intimidate the maligned group and lead to a low sense of self-worth, demotivation, and underperformance.

Another potential mediator of the effects of stereotype threat is a reduction of working memory capacity in participants. Working memory is the ability to focus one's attention on a given task while keeping task-irrelevant thoughts at bay (Engle, 2001). People with higher working memory capacity are better able to suppress task-irrelevant information (Rosen & Engle, 1998), and tend to perform better on cognitive ability tests (Turner & Engle, 1989). Some of the research seems to draw a connecting line between anxiety and this reduction in working memory. Individuals

who are more prone to anxiety report that they experience more life-stress and they perform worse than their less-stressed counterparts on measures of working memory capacity (Derakshan & Eysenck, 1998). Perhaps this is the missing link in the chain of causality from anxiety to lowered performance. Klein & Boals (2001) argued that life stress reduces working memory capacity because people under stress use some of their mental resources suppressing unwanted negative thoughts that intrude during other tasks. It would appear that individuals under stereotype threat may experience negative thoughts and concerns that lead them to suffer reductions in the working memory capacity needed to solve difficult problems (Schmader et al., 2008).

It should be noted that the research is almost unanimous in theorising that no single mediator is chiefly responsible for the detrimental effects of stereotype threat. As Steele & Aronson (1995, p.809) expressed this in their original study: "*Several mechanisms may be involved simultaneously, or different mechanisms may be involved under different conditions.*" Clearly stereotype threat is a well-researched and somewhat understood process which has detrimental effects on individuals and by association the organisations who employ them. When these individuals are present in the workforce as valued members of teams or colleagues held in high esteem, the organisation is at risk of losing their contributions through lowered performance if mitigating actions are not taken to guard against stereotype threat. The mediators have been laid out in a general sense, and the next section links onto the role of technology.

### **3. Technology and Stereotype Threat.**

The use of video conferencing has increased significantly in HE contexts in recent years because of the pandemic. Sadler (2020) reports that according to TrustRadius, there has been a 500% increase in the use of video conferencing tools in this timeframe.

The relationship between stereotype threat and technology was then examined in depth. An early study which focused on technology as a medium for stereotype threat was that of Davies et al. (2005). In that study, participants were exposed to television commercials containing overt stereotypical representations of women to test the role of stereotype threat in women's decisions to take on leadership roles. Participants who were exposed to these commercials were subsequently asked if they would like to assume a leadership role in an upcoming group assignment, or assume a more subordinate problem-solver role. Women in the stereotypic commercial condition expressed more interest in the problem-solver role than women in the

neutral commercial condition, showing that television and what is perceived on the device's screen can cue stereotype threat if a testing situation arises afterwards.

In an even earlier example, Geis et al. (1984) conducted a laboratory experiment on the effects of exposure to stereotypic commercials. Specifically, they examined whether exposure to stereotypic television commercials could negatively impact women's ambitions in life. Women who viewed the stereotypic advertisements emphasised homemaking themes over personal achievement when describing their lives "10 years from now", apparently adopting a more stereotypical female role over options such as career progression or personal development. Thus, Stereotype threat induced in a media context has been found to not only hinder performance but also elicit stereotypical attitudes toward educational or vocational fields and choices (Fordham et al., 2020).

In recent years a new medium has been used to prime stereotype threat in the literature: Virtual Reality. In 2011, Cheryan et al. demonstrated that the design of a virtual classroom environment significantly influenced women's academic choices. Groups of students were asked to don a virtual reality headset. The students were then shown three virtual classrooms, each purportedly the setting for a computer science class. The students first saw a classroom with stereotypic objects on the desks and walls, such as video games and Star Trek posters. Next they saw a classroom with non-stereotypic objects, such as water bottles and fruit. Finally, they saw a neutral classroom devoid of objects. The students were then asked which of the classes they would like to take. A minority of women but a majority of men chose to take computer science in the stereotypical classroom. Women expressed greater intentions to enrol in the non-stereotypical class than in the stereotypical class. The stereotypical classroom also caused women to expect worse performance if they were to enrol in that class. Since expectations for success have been shown to predict actual success (Wigfield & Eccles, 2000), any effort that raises students' expectations for how they will perform is important to make sure they perform well and fulfil their potential. This is possible by simply changing the design of the virtual classroom: from one that conveys current computer science stereotypes to one that does not. It is reasonable to assume that these same findings would translate to a professional setting related to computer science. Interestingly, compared to a neutral virtual classroom, a virtual classroom that added non-stereotypical objects significantly increased women's interest, ambient belonging, and anticipated success. The neutral classroom may have seemed less interesting or engaging compared to 'decorated' classrooms. However, the non-stereotypical room exposed students to an image of computer science that was radically different from their

expectations.

A second study which used virtual reality focussed on healthcare. Abdou & Fingerhut (2014), asked Black women to wait in a virtual waiting room, under the impression that they were testing a new medical service, where patients interact with a doctor virtually. The room was designed specifically for this study. In the stereotype threat condition, the walls of the virtual waiting room displayed posters containing different images and messages relaying common stereotypes of Black females. For example, one poster contained a message about unplanned pregnancy and pictured a young Black pregnant woman. The walls of the waiting room in the non-stereotype threat condition contained no posters. Black women in the stereotype threat condition who strongly identified themselves as Black reported significantly greater anxiety in the experimental health care setting than all other women.

In another experiment, Latu et al. (2013) had women speak on a topic while wearing a virtual reality headset showing them in a classroom setting. The participants were at the top of the class, facing an audience of 12 virtual reality avatars. The back wall of the classroom had pictures of different politicians, depending on which condition the participants were in. Some were exposed to a picture of a male politician (Bill Clinton), while others were in a classroom which had female politicians on the wall (Hilary Clinton or Angela Merkel). Women exposed to the positive female images spoke longer than those exposed to the male image or the control environment which did not have a poster. This contrast was also replicated for perceived speech quality, with women's speeches being rated superior in the female role model conditions by independent markers.

Finally, Starr et al. (2019) found that virtual reality scenarios might be a useful tool for possible self-interventions. Showing students a virtual reality office and telling them it was their future workplace was shown to increase positive attitudes towards STEM fields when the office was designed as that of a successful and competent STEM professional. They therefore asserted that virtual reality can be used to increase motivation and decrease stereotype threat. As seen in the research using television commercials, virtual reality is a technology which has been demonstrated to be a medium for stereotype threat cues, affecting potential targets in much the same way physical environments can.

Another technology medium which is examined in the literature is the novel one of video game avatars. Fordham, et al. (2020) found that priming gender stereotypes in a game setting influenced female participants' video game performance as well as interest in and perceptions



of STEM fields. One way in which this was primed was via the in-game avatars of the characters the players controlled. Investigating the impact of gender stereotypes in relation to female video game players, research suggests that stereotype threat can lead to reduced performance while playing and subsequently to a disassociation with games in general (Kaye & Pennington, 2016). Since video games have been shown to provide a gateway or motivation for some students to enter STEM fields, any barriers to playing video games may hinder students from doing so. Behm-Morawitz & Mastro (2009) found that women who played video games with a hypersexualised female character exhibited lower overall self-efficacy. This finding is consistent with the idea that feeling objectified induces stereotype threat (Fredrickson et al., 1998). Lee et al. (2014) found that men and women who were randomly assigned to use a female avatar in a competitive context performed worse on a math task than those asked to use a male avatar. Fordham et al. (2020) posited that avatar customisation is perhaps a useful element of many games that provides an opportunity to make their character more representative of who they are. When women are prompted to customize their avatars in ways that make personal identity characteristics (e.g., gender) less salient, stereotype threat-related effects are reduced.

The screen of a television, the virtual setting of an online gathering, and the avatar one uses to represent one's self online have all been shown as valid mediums for stereotype threat. So far, however, video conferencing software has not been examined as to whether it could be a medium for stereotype threat. This is somewhat surprising given the meteoric rise of applications such as *Zoom* and *Microsoft Teams* during the pandemic of 2020. Millions of workers suddenly found their primary work environments moved online, communicating via webcam instead of in person. These applications often have the feature to use what are called virtual backgrounds. That is, instead of seeing the environment the person on the call is physically present in, they can instead choose an image to serve as a backdrop, in much the same way as a '*greenscreen*' operates for a weather forecaster. It is reasonable to assume that these virtual backgrounds can be a medium for stereotype threat in much the same way as the physical setting of a workplace can be, or a virtual representation of one.

Further research is needed in this area. For example, would a person whose virtual background depicted some of the same stereotypical male computer science objects used by Cheyran et al. (2011) find themselves avoided by some of their female colleagues? Would someone using a virtual background of famous male leaders they admire cause underperformance of a female leader on a call relating to negotiations or decision-making?

If virtual backgrounds are proven to be a medium for stereotype threat, action should be taken by organisations to restrict what types of images can be used in order to provide an identity-safe environment. Note that banning them entirely would not be encouraged. Recall that compared to a neutral virtual classroom, a virtual classroom that added non-stereotypical objects significantly increased women's interest, ambient belonging, and expected performance levels (Cheyran et al., 2011). Therefore, it is theoretically more beneficial for organisations to provide a library of identity-safe virtual backgrounds to use rather than doing away with the feature entirely. These questions are at the core of upcoming research on stereotype threat and virtual backgrounds.

## 4. Recommendations from the Literature.

Several recommendations may be gleaned from the literature which would assist organisations and workers reduce stereotype threat in the workplace. Further, there are opportunities for research to broaden the existing literature pertaining to stereotype threat, leadership, and technology. In the context of stereotype threat, the extent to which the findings apply to video conferencing in organisations and HE contexts is a key recommendation.

### 4.1 For Organisations and HEIs.

- Culture of learning: Organisations and HEIs need to promote a culture of learning, especially as it pertains to managerial nous. While there are likely to be programs geared toward new managers in any organisation, there is often a dearth of training courses aimed specifically at managers of managers or director level and above. This could inadvertently give the impression that the qualities of these more senior positions are inherent or naturally occurring, a cue for stereotype threat.
- Job postings: Organisations can increase the likelihood of minority representation at senior management levels by reviewing gendered language in online job postings. When a prestigious healthcare award removed a section on risk taking from its selection criteria, more females applied and won the award (Carnes et al., 2005). Applications such as *Textio* can be used to examine blocks of text for gendered and make recommendations of more neutral terms for offending phrases or adjectives. The use of these tools should be made a standard, and care taken to ensure all job postings are reviewed.

- Role models: Organisations require more female and minority representation at all levels of leadership in order to provide stereotype-disconfirming evidence of success at these levels.
- Organisational audits: Following Williams' (2014) recommendation, an organisational audit to examine gendered practice should be developed by organisations. This should include the physical environment and design of common areas such as canteens and lobbies for potential cues that could signal a specific cultural centeredness is present. This could cause staff to feel like they do not belong in that area, and it may cause some staff who do not fit that culture to decide against joining the organisation or university.
- Video conferencing backgrounds: Until further research is done, organisations should provide guidelines for the use of virtual backgrounds in video conferencing software. Providing a curated library of identity-safe options to staff would be a relatively simple way to ensure conformity while also providing a choice. The IT and HR departments could liaise to do this efficiently and in a timely manner.

## 4.2 For Individuals.

- Adopt a growth mindset: Having a growth mindset of leadership and learning means having the belief that the qualities associated with a good leader are grown or cultivated over time and with experience. This allows employees to question the stereotype of leadership being gendered towards men, since anyone can learn those traits. This increased identity-safety should lower the risk of employees experiencing chronic stereotype threat.
- Awareness of personal workspaces: Staff who are part of a majority group can also help reduce stereotype threat. Monitoring their offices, cubicles, and workspaces for cultural centeredness can help remove stereotypes present in the physical setting, neutralising their effect as situational cues.
- Utilise self-affirmations: Positive self-affirmations and expressive writing have been shown to reduce stereotype threat and increase performance expectations. Minority workers can utilise these methods to increase their sense of belonging with a particular setting before entering it, or with a particular role before executing a responsibility

associated with that role, for example a leader who intends to speak in front of an assembled crowd.

- Push for diversity initiatives: Grass-roots petitioning can often drive change in organisations. Calls for diversity initiatives could result in a more proactive approach taken by senior management to address under-representation. For example, the 30% club is a global campaign committed to achieving better gender balance at leadership levels for better business outcomes. This provides greater opportunities for role models for minority workers, increased ambient belonging, and reduced stereotype threat over time.
- Use neutral virtual backgrounds while video conferencing, and include UDL guidance: Until more research is conducted, neutral backgrounds should be used by staff while using video conferencing software. This will reduce the risk of the virtual background acting as a situational cue signalling a lack of belonging to other staff who may then question their ability. In the HE context, Universal Design for Learning (UDL) is a way of thinking about teaching and learning that removes all barriers and helps give all students an equal opportunity to succeed. These guidelines have been developed to meet the varying requirements and needs of educators and students. These purposes include supporting teamwork, student-to-student mentoring, practical demonstration with synchronous interaction, immediate feedback, literature circles and book discussions, audio conferencing, problem-based learning (Smyth, 2005; Donnelly, 2010), real-time peer tutoring, among others.

### **4.3 For Research.**

- It is recommended that additional studies be carried out on leadership groups in different industries. Heilman et al. (2004) noted that successful female subjects were liked less by both male and female colleagues. It would be interesting to see if that changes depending on the traditional sex-typing of different industries (e.g. nursing vs engineering), indicating different expectations of leadership qualities in the different industries.
- Further, contemporary examination of the gendered stereotype of leadership is needed, to ascertain if this stereotype (documented in the mid-nineties) still holds today.
- Finally, research into the use of video conferencing software is essential to gauge the

likelihood of virtual backgrounds acting as situational cues which could trigger stereotype threat.

## 5. Findings - Leadership Relevance and Impact.

The new landscape of collaborating online primarily through the use of video conferencing software was unceremoniously foisted upon many companies and HEIs during the pandemic of 2020. Since then, research has been carried out into how this effects social capital, inclusion, and belonging in employees. What has not been studied is the effects of replacing the physical environment of the office with the virtual environment of video conferencing software, and in particular, the use of virtual backgrounds. These backgrounds are often not policed by the company/HEI and employees are free to use best judgment on what is appropriate. It is common to see images of popular television shows, movies, and computer games used as backgrounds. While it is understandable that companies/HEIs have not brought in guidelines due to the sudden arrival of this new environment, it is important that we evaluate the safety of this feature in the context of identity threat. A group which may be particularly at risk due to widely-held stereotypical views on leadership are female leaders (Koenig et al., 2011).

Retention of talent, and especially diverse talent is of special interest to technology organisations, which tend to be male dominated (Holtzblatt & Marsden, 2018). This is the case in the organisation in this study. The competition for technology workers continues to increase as the sector flourishes. Indeed, in 2020, information and communications technology companies accounted for 70% of the total office space take-up in the city for the year (Savills Research, 2021). A driver of this behaviour is the fact that Dublin is home to over 2200 start-ups and 9 out of 10 of the world's global technology companies, such as Google, Facebook, LinkedIn, Twitter, and Amazon (Talent Garden, 2020). Coupled with the rising cost of recruiting new talent rising, this competition makes the retention of leaders a strategic rather than a tactical endeavour (Virick & Greer, 2012) and of vital importance to continued organisational success.

If the stereotype theory underpinning this study had been proven to occur, companies could have taken steps to prevent it, such as creating policies about what is and is not allowed to be used as a background image in video conferencing calls. Doing this could then help organisations retain more diverse talent in an extremely competitive market and potentially reduce costs. If the research did find that the virtual background feature can indeed act as a medium for stereotype threat, it could lead to significant social, cultural, and technological

impacts.

It is important to note that the short term impact would include the IT communication policy being altered to restrict the virtual background feature so that end-users can no longer select their own virtual backgrounds (this option is already available as an administrator action in Zoom), and instead select from a curated list of identity-safe backgrounds provided by the company. The long-term impact of an increase in role models is important. Role models have been shown to be an effective way to combat stereotype threat in organisations when it comes to perceptions about leadership (Cortland & Kinias, 2019; McIntyre et al., 2003).

There are some managerial risks which may also need to be considered. Restricting virtual backgrounds in a company which has previously seen unrestricted usage may be perceived as management curtailing the creativity of their workforce. Virtual backgrounds can be used as a form of self-expression. It is not uncommon to see people change their background to match popular occasions. Mitigating this perception of management '*cracking down*' on a fun activity is an important consideration. This can be done through education and a positive communication campaign about the benefits of the policy change.

Findings from the review of the literature are summarised in Figure 3. Stereotype threat is a form of identity threat that occurs when a member of a marginalised social group suspects that they will be evaluated through the lens of a negative stereotype in a given situation. Through various means, such as increased anxiety and lower motivation, this worry and increased vigilance results in lower performance. Applying this phenomenon to the workplace has implications for organisations, where stereotype threat can hinder the productivity and career progression of these individuals. The cumulative effect of this is likely to have negative impacts on the organisation's effectiveness and profits. The physical setting, under-representation of minorities or genders, and different types of technology have all been shown to cause decreases in performance via stereotype threat in certain situations.

**Figure 3: A synopsis of the findings of the SLR**

## 6. Conclusion.

Several learnings are available to organisations and HEIs. Ensuring that the physical environment does not convey stereotypes about the group which inhabits it helps by not alienating people who may not fit that stereotype. Similarly, ensuring minority and gender representation at all levels helps to prevent solo status, increases access to potential role models, and increases the ambient belonging felt by minority groups in an environment. Finally, awareness that technology may be a medium for stereotype threat allows companies to make more inclusive video communications and allows workers to choose more suitable avatars.

In reviewing the literature, a gap was found in the research relating to video conferencing software and its role in triggering stereotype threat. It is reasonable to posit, for example, that someone on a video conferencing call using a virtual background consisting of images of

famous male leaders, might trigger stereotype threat in a female leader also on the call in much the same way as the posters of male leaders in the virtual classroom did in Latu et al. (2013).

Further research is needed to determine if this assumption is correct and examine if gendered virtual backgrounds can influence performance of marginalised individuals in the same way as has been seen in physical environments and in virtual reality. If this is the case, organisations and HEIs may need to restrict the images their staff use as backgrounds to a set of pre-approved or curated ones in order to ensure an identity-safe work environment for minority and gender groups.

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