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Addressing the Phrase, "I'm in PR because I hate math:" Role of Experiential Factors in Developing Closeness to Numbers through Practical, Civic, and Cultural Numeracies

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ABSTRACT

Using theoretical frameworks of psychological distance and science literacy, this study introduces the construct of "closeness to numbers" conceptualized as: (i) practical numeracy – an understanding of how to use numbers, (ii) civic numeracy – a sense of comfort and confidence in discussing numerical data, and (iii) cultural numeracy – an appreciation for numerical data in the field. Using semi-structured in-depth interviews with public relations/ communication students (n=15) and professionals (n=20), this study found that practical numeracy can be developed even if some struggled with it early on, civic numeracy nurtured at home and school can become integral at work, and cultural numeracy can be nurtured even if one is struggling with other numeracies. Experiential factors mattered significantly in developing closeness. Use of concrete contexts, establishing a supportive community, and inoculating against number trauma and negative self-talk contributed to building closeness to numbers.

Keywords: data literacy, analytics, research, relationship to numbers

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Many who choose public relations/communication (PR/Comm) do so because they are drawn to communication, creativity, or writing (Bowen, 2003; Plowman et al., 2022), but not because they love numbers. Some even say, "I deal in words, not numbers," "I'm a writer, not an accountant," or "I went into [communication] because I hate numbers," but there is a benefit from learning the "language of numbers" (Jaye, 2016). Data literacy allows us to demonstrate the value of PR/Comm and contribute to the strategic management function of a company (Grunig, 2006). Many practitioners (Adams & Lee, 2021; O'Neil et al., 2023) and institutions such as the International Association for Measurement and Evaluation (AMEC, 2022), Commission on Public Relations Education (CPRE, 2022), and the Global Alliance for Public Relations and Communication Management (Global Body of Knowledge [GBOK], Manley & Valin, 2017) note a proficiency in measurement, evaluation, and business/finances as a necessary skill for practitioners.

This study explores how PR/Comm students/professionals can nurture a "closeness to numbers," which is a new construct informed by psychological distance (Krielkamp, 1970; Trope & Liberman, 2010) and science literacy (Shen, 1975). The goal of this study is not just to identify tactics that will address anxiety, frustration, or disinterest in working with numbers for a single task but to inspire a lasting connection.

PR and Its Relationship to Numbers

Media often depict PR/Comm professionals as living glamorous lives focused on event planning, publicity, or damage control, portraying the profession as centered on implementing tactics with little substance, often to build/repair an image by concealing/altering the truth (Spicer, 2009; Yoon & Black, 2011). These portrayals affect student perceptions, and it is not until they begin coursework/internships that they realize PR involves data-driven strategic planning (Bowen, 2003).

The Barcelona Principles 3.0 (AMEC, 2022), the CPRE report (2023), and the GBOK (Manley & Valin, 2017) stated the ability to measure and evaluate using metrics, translate research to insights, and "visually and persuasively tell the data's story" (CPRE, 2023, p. 66) as crucial to our profession. Thus, nurturing a closeness to numbers would aid in developing students/practitioners who can intentionally, ethically, and meaningfully (principle 7) use all types of data (principle 4) to set measurable goals (principle 1) and assess necessary outcomes (principles 2, 3, 6), demonstrating the value of the field (AMEC, 2022).

The Construct: Closeness to Numbers

"Closeness to numbers" was inspired by the theoretical framework of psychological distance (Krielkamp, 1970; Trope & Liberman, 2010). Psychological distance is how close or far one feels from an object, person, or experience (Kreilkamp, 1984; Trope & Liberman, 2010). Lack of activity/commitment can create a sense of distance and feelings of appreciation can foster closeness (Krielkamp, 1970; Kreilkamp, 1984). Mere presence doesn't equate closeness, and closeness doesn't always require physical presence (Kreilkamp, 1984). Closeness to numbers does not simply mean having numbers in one's curriculum/practice, nor does it suggest being adept at numbers.

This study uses Shen's (1975) three forms of science literacy to conceptualize closeness to numbers. While Shen aimed for a public understanding of science – encouraging engagement without needing direct involvement with science – this study aims to equip PR/Comm students and professionals to work directly with numbers by fostering closeness to them. Thus, Shen's framework here is adapted, rather than directly applied.

The first form is practical science literacy, which Shen (1975) describes as "the possession of the type of scientific and technical know-how that can be immediately put to use to help improve living standards"

(p. 265). Building on this, I propose practical numeracy as a dimension of closeness to numbers, which involves possessing the technical knowledge and skills to use numbers in our field – for formative research, analytics, etc. The second form is civic science literacy, intended to "enable the citizen to become more aware of science and science-related issues… [to] participate more fully in the democratic processes of an increasingly technological society" (p. 266). He adds that someone with this form of literacy is "stimulated, rather than confused" (p. 266) by it and emphasizes the need to "convince [them] that [they have] no reason to shy away from it" (p. 267). Following this, I propose civic numeracy as the comfort and confidence in discussing numerical data. Like civic literacy, this involves being stimulated rather than intimidated by numbers and staying engaged by asking questions or having conversations even when concepts seem confusing/complex. Just as Shen stresses the importance to communicate clear, jargon-free information to sustain public engagement with science and policy, civic numeracy relies on accessible content and opportunities to ensure continued engagement with numbers. Finally, the third form is cultural science literacy, which "is motivated by a desire to know something about science as a major human achievement; it is to science what music appreciation is to music" (Shen, 1975, p. 267). He argues that appreciating science does not require knowing technical details and suggests that claiming otherwise "reveals the arrogance of science in our century" (p. 268). Drawing from this, I propose cultural numeracy as the appreciation of numerical data in our field, which can be nurtured regardless of one's practical/civic numeracies.

Closeness to numbers captures the concept of building efficacy, i.e., believing one can work with numbers (Bandura, 1997), but also involves fostering a desire to continue learning, communicating, and engaging with numbers. Those who feel close to numbers are open to the uncertainty and discomfort of not knowing everything immediately and remain interested in solving numerical problems.

Factors Affecting Closeness to Numbers

As social cognitive theory [SCT] explains, an individual's ability to learn is influenced by the "triadic reciprocal causation" between one's personal, behavioral, and environmental factors (Bandura, 2001). SCT would dictate that where one grew up, how numbers were introduced or discussed, and how one reflects on their own experiences can shape their closeness to numbers. While the research shared below does not explicitly apply SCT, it shows the potential influence these factors have on closeness to numbers.

Spatial Factors

Children growing up in rural or low-income areas often struggle with math due to limited access to educational resources (Magnuson et al., 2004; Miller & Votruba-Drzal, 2013). The extreme stress of such environments can negatively impact a child's ability to absorb information (Evans, 2004), making learning numbers feel unattainable, hindering their ability to nurture closeness with numbers. Thus, the physical environment a student would have inhabited is likely to shape their closeness to numbers in college.

Social Factors

Children with parents or family members in science, technology, engineering, or mathematics (STEM) fields, who value math for future employment, are more likely to perform well in math (Anaya et al., 2021). Teachers, who are also part of a student's social network, impact students' comfort and efficacy in studying math (Beilock et al., 2010; Schaeffer et al., 2021). Peers also influence one's relationship to math (Kim et al., 2023). Thus, an individual's social network of family, teachers, and peers is likely to shape their closeness to numbers in college and at work.

Experiential Factors

How one internalizes their experiences with numbers matters. Evidence suggests that math anxiety and math ability/performance are connected (Young et al., 2012). A factor in overcoming this obstacle is

a student's self-talk i.e., how they interpret and narrate their experiences with math (Meece et al., 1990; Ramirez et al., 2018). If a student has a low self-concept, engages in negative self-talk, and has poor self-regulation, they're more likely to develop math anxiety (Ahmed et al., 2012; Jain & Dowson, 2009). The internal narrative a student/professional maintains becomes a self-fulfilling prophecy (Ramirez et al., 2018), affecting how they view their past and future math experiences (Sherman & Cohen, 2006). The internal negative narrative seems to grow stronger when students feel like they have little control over their learning or feel like imposters (Tovey et al., 2022) which affects their efficacy and overall performance (Meador & Salazar, 2023). Thus, continually telling oneself they're not "math-minded" can create an identity that blocks their ability to work with numbers.

Math anxiety among PR/Comm undergraduate students is well-documented, with many expressing apprehensions about numbers (Baus & Welch, 2008; Laskin & Sisco, 2015; Maier & Curtin, 2005; Rancer et al., 2013). A few studies have explored ways to address this anxiety among PR students. For example, Laskin and Sisco (2015) found informing students of the basic level of math needed in a course reduced anxiety and promoted interest. Bayliss (2020) found using a flipped classroom format with hands-on activities effective in increasing students' understanding of statistics and their self-efficacy in PR courses. However, beyond these studies, little research exists on reducing math anxiety, addressing frustration, or fostering a lasting relationship with numbers among PR/Comm students. Thus, this study poses the following RQs which explores how we can develop closeness along the three types of numeracies, the impact of the three factors on those numeracies, and potential strategies to nurture an overall closeness to numbers:

RQ1: How do PR/Comm students/professionals develop ability to:

(a) learn basic math/statistical skills (i.e., practical numeracy), (b) engage comfortably in discussions about numbers at school/work (i.e., civic numeracy), and (c) appreciate the value of numbers in the field (i.e., cultural numeracy) for the long run, not just for a single task/course?

RQ2: How do (a) spatial, (b) social, and (c) experiential factors affect this closeness?

RQ3: What strategies are helpful in developing closeness to numbers?

Method

Semi-structured in-depth interviews were conducted with students (n=15) and professionals (n=20), including educators, practitioners, and researchers in the field. Some students were enrolled in PR programs, while others took PR classes within Communication programs. Some professionals worked in PR, while others performed PR tasks within broader communication roles. I contacted PR educators and practitioners via email, securing two educators and two professionals to interview. The rest responded to my LinkedIn post. Everyone who agreed to participate was interviewed. All interviews were recorded on Zoom with permission. Due to limited funding, only student participants received a $25 e-gift card incentive.

Sample

Among the 15 students, 13 were undergraduates, one was pursuing a master's degree, and another a doctoral degree. Eight undergraduates were PR majors, two were PR minors, and one was pursuing a PR certificate. Some were pursuing humanities and social science degrees. One undergraduate had just graduated a few days before the interview. The master's student was receiving her degree in journalism. The doctoral student had a master's in strategic communication and was pursuing a doctoral degree in communication and media. The average student age

was 21, with one student being 41. Nine identified as female, and six as male. Twelve identified as White, including one who also identified as Hispanic; three identified as Black, including one who also identified as Asian. None of the students were currently enrolled in classes with me, although eleven had me as an instructor in the past.

Among the twenty professionals, one had a PhD, 12 held master's degrees, and 7 had bachelor's degrees as their highest education level. Twelve had PR/communication degrees, and all were practicing, teaching, or conducting research involving PR/Comm in their current positions. The professionals used data/media analytics, business analytics, and/or statistics in their roles. Thirteen identified as female and seven as male. The participants ranged in age from 23 to 66, with an average age of 38. The sample included 14 who identified as White, including one who also identified as Hispanic, and 6 as Asian/Asian-American/Indian/Indian-American, with one also identifying as European.

Positionality and Reflexivity

I struggled with math until 8th grade, when my math teacher, Ms. Renuka, changed my relationship with it. I grew confident in math, sometimes even enjoying it, and eventually earned an engineering degree before pursuing graduate degrees in communication. I currently work as a researcher and educator in a PR/Comm program. My experiences as (i) someone who worked to develop a closeness to numbers, (ii) an educator who teaches students with varying levels of anxiety, frustration, and interest in numbers, and (iii) a scholar interested in developing the construct of closeness to STEM inspired this study. My background and experiences may have influenced participant disclosure, but it also facilitated access, rapport, and trust during interviews.

Analysis

During interviews, I took notes (Ellingson, 2012; Lindlof & Taylor, 2011) to keep track of examples/points I wanted to revisit. I also noted demographics during this time. I continuously reviewed the recorded

transcripts and my notes to keep generating categories using open coding techniques by looking for repetition, similarities, and differences, and then using axial coding I explored the connections between the generated categories, and finally using selective coding I extracted themes that related to the literature presented above (Ryan & Bernard, 2003) of math anxiety, the three dimensions of numeracy, the three factors affecting numeracy, or the strategies they used.

Results

RQ1 was about understanding how participants developed their practical, civic, and cultural numeracy. Participants reported taking math in school, and many had to take at least one such course in college as a requirement. More professionals than students indicated having a good relationship with numbers, and some professionals and students mentioned having a mixed/complicated relationship with numbers.

Practical Numeracy

All professionals reported feeling competent about working with numbers. One professional (White, male, 50) explained, "If [we're] going to be the conscience of the organization and if [we] can't understand that something is wrong with the balance sheets…if you can't understand that the claims that are being made are spurious…you're setting yourself up for failure." Thus, practical numeracy was seen as essential among the professionals.

Developing practical numeracy was not immediate/easy for some professionals. One shared that although their work now involves numbers, they once failed math in school (White, female, 31). Another (White, female, 38) who now does quantitative measurement remembers being told in school that she wasn't good at math and was wasting her time taking advanced classes/tests. Another (Asian, female, 36) said she didn't enjoy math but had to work hard for it because she was anxious about failing. That changed in graduate school, and now she works with

quantitative data often. A PR academic who teaches analytics (White, male, 58) remembers "vividly, standing at the board, dripping sweat, staring at math problems…I could feel the eyes boring holes in the back of my head as I stood there feeling like an utter f***ing failure…and not getting any kind of assist from the teacher."

Embedding numbers in the PR context helped them. For example, one professional (White, female, 31) mentioned,

> With my mortgage…I don't know what any of these numbers mean…but then, when you…put an actual story behind it… make the numbers mean something I feel like it's so much easier to comprehend [like] knowing that these numbers are [going to] help…people get cancer screenings, or…go to the doctors this month.

Some students felt frustrated with numbers, others felt anxiety, and a few felt both. One (White, female, 21) mentioned being brought to tears while working with numbers, and another (Black, Asian, female, 22) remembers liking math until her teacher began calling on students to answer questions, punishing her when she answered incorrectly or took too long. Another (White, female, 21) mentioned it affected her ego: "I associated…math with feeling stupid because…I don't feel this way in English, and I don't feel this way in History…And then…I have to go to math where…I'm [going to] get the answer wrong."

Many students didn't start off feeling negatively about math, but early experiences affected their practical literacy. Some felt that not being in advanced math classes reinforced the belief they weren't good at math. Mentions of math in college then seemed to trigger past trauma. For one, however, a college experience helped renegotiate her practical literacy. This student (Black, female, 22) liked math and was placed in advanced math her senior year of high school. During a difficult time, her teacher was "so uncaring and so hard" on her that she stopped caring about math, and her grade suffered. Years later, in college, she had to take a math class.

She felt extremely anxious but had a professor who took time to check in and answer questions about math and coding, and she ended the class with a 97. She realized, "it wasn't me that was bad at math…even if I didn't enjoy it, I could do it."

Since these students were still in school, it was unsurprising that they did not feel completely competent in their practical numeracy. One (White, male, 20) stated, "until I have that hands-on experience…I don't know…how…knowledgeable I really am." Similarly, another (White, male, 22) expressed, "I just don't think I've had like a ton of experience with that kind of stuff…I am more confident with like analytics, but…like tracking a campaign…I don't have a whole lot of experience with [that]."

Overall, more professionals than students in this study felt a high level of practical literacy. Some professionals did not always have high practical literacy. Many students experienced difficulties with practical numeracy in their early education, contributing to the frustration and/or anxiety they felt when building their practical literacy.

Civic Numeracy

Civic numeracy was prominent among professionals, likely because many of them were working with, interpreting, and reporting numbers to their clients, executives, or other stakeholders as part of their work obligations. For example, one (White, female, 33) mentioned how she needs to share results and insights with content creators, who are often not as familiar with numbers but who need them to be effective. For another (Asian, female, 23), sharing numbers gave her an opportunity "to prove to [her] clients" the impact of analytics and PR, who might otherwise be unable to assess the impact of our work. Another (White, female, 28) mentioned sharing with her interns:

> It's really hard to measure the success of a PR campaign. And it's really hard to convince someone who's not already your client or who doesn't know PR, that PR is worth it…We have to be able to

show them that they are going to get their money's worth if they come with us.

The ability to not only use numbers but to contextualize and communicate to convince clients/colleagues about the value added by PR was emphasized. Many professionals also mentioned frequently turning to their team or colleagues when stuck with numbers or tools.

For many, a parent, sibling, teacher, or peer was there to answer questions. One professional (White, female, 33) described it as having "comfort" in talking about numbers at home, where she would, for fun, occasionally compete with her sister in remembering multiplication tables. Another (Asian, female, 23) mentioned her mother, an accountant, always being there to help with homework. For some, teachers took an interest in explaining things and peers were helpful in clarifying and asking questions about numbers. Overall, for professionals, the ability to speak about numbers seemed to have been nurtured at home and school, which carried into work.

Similarly, many students mentioned engaging in conversations about numbers with their family, teachers, or tutors. Most of the time, it was when they wanted help with numbers, mostly in private or in small settings, and rarely immediately in class or a group setting. As one student (White, Hispanic, female, 20) put it, they "always…did well one on one…if someone's explaining a concept to me and…we're having a conversation…I can grasp what's going on at my own pace." For others, it was online resources where they could ask Google or look it up on YouTube to help practice their civic numeracy by way of building practical numeracy.

Overall, for students, conversations about numbers often involved trying to understand or troubleshoot, whereas for professionals, it was a necessary aspect of their job for showing their professional worth, which aligns with the often high-stakes settings that PR professionals have to

function unde,r including using metrics to show campaign effectiveness, understand audiences, or justify their actions and resources. Those who noted engaging in open conversations also seemed less likely to keep questions or concerns to themselves. Instead, they were able to discuss them openly at home, school, or work, which contributed to their civic numeracy.

Cultural Numeracy

For many students, although there was anxiety/frustration with numbers, they were able to appreciate the role of numbers, especially when they saw it in the context of PR. As one (White, female, 21) explained, we in the field use "math to understand people." Once students realized that the numbers used in PR were not the same as the math they did in early education, they became more appreciative of its relevance in the field.

Many professionals demonstrated a strong sense of cultural numeracy. For some, a love and interest in numbers began at a young age. One (White, male, 64) recalled the excitement he felt in "third grade, where the principal came into the room [for] an advanced math class, and we were all excited to find out the truth about if there was such a thing as negative numbers." Many appreciated the value that numbers brought to the field. As one (White, female, 31) explained, "math is kind of the glue that holds the storytelling together and it's how you can make storytelling go from being a story to something that actually matters and can drive strategy." For some, the ability to create with numbers was exciting. As one (White, male, 50) shared:

> If you're using [numbers] ethically…there is a certainty to what they're doing….even if you're forecasting things, there's a probabilistic certainty of that. You can stand behind that…there's something about real numbers that you get to play with and look at and understand…there's a beauty.

There was excitement in continuing to learn, with one (Asian, male, 24)

expressing a desire to become "a Swiss Army knife analyst" who could do it all.

Factors – Spatial, Social, and Experiential

RQ2 was about understanding how spatial, social, and experiential factors affected this closeness to numbers. The following sections explore these factors.

Spatial Factors

Data did not suggest that spatial factors had an impact on closeness to numbers. One participant from a rural region, two from suburban regions, and five from urban regions had a complicated/mixed relationship with numbers. Seven from suburban regions and four from urban regions did not currently/always have a good relationship with numbers. Five from suburban regions and nine from urban regions reported always having a good relationship with numbers. Overall, there was not enough variation in regions and closeness among participants to assess the impact of spatial factors on closeness to numbers. Everyone, however described growing up with sufficient access to educational resources.

Social Factors

Many professionals and some students mentioned growing up in households where at least one parent had a STEM degree or worked in a science/engineering/medicine/finance/math. Some had a parent/grandparent who was a teacher, including a couple who were math teachers. Some reported receiving help from parents/siblings when they struggled with math. For example, one (Asian, White, female, 44) credited her dad and brothers for helping her with math. Another (Asian, female, 23), mentioned her mother, an accountant, helping her. For one (White, male, 20), it was his grandmother, a math teacher, who explained concepts to him when he struggled. Overall, many professionals came from environments where they had people to turn to with questions about numbers, while this was relatively less common among students.

Experiential Factors

A striking common thread among all professionals was that none expressed internalizing their struggles or negative experiences with numbers in a way that affected their self-concept. This connects back to civic numeracy, which nurtures open conversations over internalization. Although some failed or struggled with courses and had traumatic experiences, they maintained an attitude of patience, allowed themselves to struggle and learn from mistakes, and never gave up on themselves.

One professional (Asian, female, 23) was grateful for the patience within and around her: "Just really allowing myself time to deal with it… [being] patient with myself and other people [being] patient with me….all the patience…together really helped." Another (White, male, 50) shared his ability to allow himself to be human:

> I've made some big whoppers when it comes to number mistakes, and…everybody's made…errors. And I remember the ones that haunt me. And I feel like, yeah, that wasn't right, and I screwed that one up…So...it's double-checking. It's triple-checking… everybody makes mistakes. We're human.

Another (White, female, 38) shared how, even when her teacher didn't have faith in her, she kept faith in herself:

> I took the AP test…I failed every assignment in the class…but I would show up at 7 in the morning for…the teacher, to sit down with me and help me and answer my questions…and my very sweet teacher says…you might be wasting your money on this test…I recommend you didn't take it. And I said, I'm [going to] take it. I studied super hard for it…And I passed.

More students than professionals internalized anxiety and frustration with numbers, except for those who reported feeling somewhat positive towards numbers. Even as some students started doing better in college math courses, like the one student (Black, female, 22) who eventually earned a 97, still felt anxious about working with numbers.

Some students felt that their anxiety drove them to perform poorly. One (White, Hispanic, female, 20) remembered how her anxiety affected her performance and recalled feeling "a tightness in my face that it was almost just like a verge of tears." She remembers sitting at the kitchen counter with her dad who would:

> Yell the things out at you…I just remember he…always looking at me…he couldn't fathom the thought that…I just didn't get it. And I think…'Oh, I'm the dumbest person alive' and obviously I wouldn't…hold up the idea in my head…because…I was excelling in other areas…So, I was like [math is] just stupid.

Others felt their struggling performance caused frustration and anxiety with numbers. One student (White, male, 20) explained, "performance came before the anxiety for me… It advanced to a level where I needed like medical care for it…because I just…sort of planted these seeds of doubt, of…talent and…ability."

Strategies for Developing Closeness to Numbers

RQ3 was about finding the strategies that helped participants develop their closeness to numbers. Data revealed two strategies to build numeracy, while one was to heal experiential trauma.

Use Concrete Contexts to Build Practical and Cultural Numeracy

As one professional (White, female, 31) put it, in school, math felt like "an abstract concept" compared to science, but that flipped once she started her job. Professionals attributed their excitement for working with numbers to the context. For example, many students and professionals mentioned that their desire to work with numbers often came from a desire to engage in data storytelling. This was grounded in a concrete context that mattered to their organization/client. One professional (White, female, 41) explained, "data, it tells the story. Like I could show you…Twitter…is a dumpster fire…like my offices do not need to be spending time there. The data is showing…LinkedIn…they should spend more time there."

Context appears to bring meaning because it's embedded in a frame of problem-solving, which involves building comfort during the uncomfortable moments while figuring it out. For example, one professional (White, male, 64) explained,

> In grad school we had…a very detailed class on statistics, which everybody dreaded…I had to get in the mindset of being a student…it brought me back to my childhood, where I thought math was like a puzzle… they are rules here, and…you'll figure it out as long as you understand what the rule is.

This participant helps instill in his students a similar approach of problem-solving with data. One (White, female, 26) wished college PR classes, including writing courses, would incorporate more numbers into the context. Overall, several agreed on the power of having a concrete PR context that provides a problem-solving approach to help inspire practical numeracy by means of cultural numeracy.

Nurture a Safe Community to Practice Civic Numeracy

Many mentioned that when they are stuck with numbers, they approach others on their team, peers, colleagues, mentors, teachers, or family for help. Feeling comfortable asking for help, as discussed in the previous section, was nurtured from a young age for some. When they felt stuck or didn't understand something, they had people who did not shame them but instead took the time to explain. Some even mentioned using online resources such as seminars, Google, YouTube, or Codecademy for help. Whether in-person or online, having a safe network of support seemed helpful in building civic numeracy.

Inoculation Against the Number Trauma and Negative Self-talk – "It's Not the Same Math"

As one professional explained, "it is important to remember that it's not the math we are taught in school" (White, female, 41). One (White, male, 50) says they use the term "data" to avoid triggering past notions

of math. The thing to remember, as one professional (Asian, female, 36) explained, is:

> What we want to be focused on is not the math, it's the interpretation of the math, of the results of the math, and when you can provide…data-driven results and data-driven insights, that's when people will listen to you…that's the value you're adding to your employers and that's the way to get jobs.

In fact, it is often this aspect of data interpretation and presentation to advise clients that students should be trained on, given that they are rarely afforded opportunities to complete full PR campaigns. Several students echoed that they felt relieved when they realized that the numbers in our field are not the same as those they associate with their trauma. However, they acknowledge that they might still be triggered by it, so as one student explained, "if you're [approaching] it from like an 'everyone should know this' attitude then…[the] anxiety just gets greater," and it becomes hard for the student to be open to learning and to not engage in negative self-talk. Thus, it seems effective to inoculate against past trauma or negative self-talk, but letting the student/professional understand that the use of numbers is very different from their past experiences and encourage them to approach it using a fresh slate of mind.

Discussion

This study examined closeness to numbers through practical, civic, and cultural numeracy among PR/Comm professionals and students. Students often struggled with math anxiety/frustration stemming from early experiences. While some professionals had similar struggles, many reported high levels of practical numeracy. Civic numeracy was more common among professionals, likely due to workplace demands and support networks fostering open dialogue. Both groups valued cultural numeracy, regardless of their practical or civic numeracies. Experiential factors shaped relationships with numbers, with professionals

demonstrating resilience and a growth mindset, while students often internalizing negative experiences. Three strategies emerged to foster closeness to numbers: (i) using concrete contexts to build practical and cultural numeracy, (ii) nurturing supportive communities to practice civic numeracy, and (iii) inoculating against math-related trauma and negative self-talk by encouraging a fresh mindset.

Theoretical Implications

Grounding abstract concepts in concrete contexts aligns with concreteness effects (Borghi et al., 2017; Tallapragada et al., 2021). Concrete contexts promote quick and accurate processing (Stadthagen-Gonzalez & Davis, 2006) while abstract language can trigger existing schemas (DiMaggio, 1997), potentially explaining the aversion to terms like "math" or "numbers." Future research should further explore the role of abstract-concrete cognition in this area.

Findings also align with prior research showing that experiential factors such as self-concept ("I am good at math"), self-esteem ("I like math"), and self-efficacy ("I can work hard at math") have an impact on one's closeness to numbers (Hay et al., 2021, p. 266). While coursework helped, having a positive self-concept was more critical for reducing anxiety/frustration (Ahmed et al., 2012; Meece et al., 1990). Although some suggested an inoculative approach, future research should explore how to improve self-concept and inner narratives about data literacy, including deconstructing negative self-images and fostering confidence through patience and resilience. Redefining what it means to be "good" at math, statistics, or numbers can challenge misperceptions and strengthen self-concept around numeracy. Additionally, given the significance of civic numeracy, future research can explore how such supportive networks can facilitate such reconstructions.

While in-depth interviews and my connection to the topic provided deep insights, they may have also influenced responses, and so replicating and triangulating these findings through other methods, such as surveys to

validate a scale for closeness to numbers or online/ psychophysiological experiments to test proposed strategies, would strengthen the results.

Practical Implications

This study recommends grounding PR/Comm education in concrete contexts using meaningful organizational problems to help our students/professionals approach numbers with curiosity and eagerness. Building on this idea, the CPRE (2023) recommends integrating data across the curriculum (e.g., writing and capstone courses) rather than confining it to the Research Methods or Analytics courses. Assignments could include real-world inspired simulations or case studies involving data interpretations, visualizations, and presentations to nurture practical and civic numeracy simultaneously. Such exercises can also help in redefining internal narratives around working with numbers and contribute positively to their identity with numbers.

Reports, including CPRE (2023) and GBOK (Manley & Valin, 2017), show the growing recognition of data literacy in the field. However, as CPRE (2023) notes, administrative support is crucial for integrating data skills into curricula, and offering professional development opportunities is crucial for nurturing this closeness at work. A recent report commissioned by Tableau (Forrester, 2022) surveying about 2000 employees and managers across 10 countries found that many organizations valued data literacy but lacked in providing training on it. Many employees also reported feeling frustrated with their data skills and hesitant to seek help. They found that organizations that invested in building data literacy among their employees reported higher productivity, employee satisfaction, and retention. These reports and this study underscore the need to provide training, but also to create supportive environments that nurture this closeness to numbers that could ultimately impact practitioners' ability to successfully implement the Barcelona Principles 3.0 (AMEC, 2022).

Overall, we must stop perpetuating the notion that PR is for those who hate math. As educators and practitioners, we must find ways

to nurture closeness to numbers, regardless of one's prior experiences, knowledge, or skills, before entering our field or while in it.

References

Adams, M., & Lee, N. M. (2021). Analytics in PR education: Desired skills for digital communicators. *Journal of Public Relations Education, 7*(2), 44-76. https://journalofpreducation.com/wp-content/uploads/2022/12/91f4a-adams_-jpre-72.pdf

Ahmed, W., Minnaert, A., Kuyper, H., & van der Werf, G. (2012). Reciprocal relationships between math self-concept and math anxiety. *Learning and Individual Differences, 22*(3), 385–389. https://doi.org/10.1016/j.lindif.2011.12.004

AMEC (2022). *Barcelona Principles 3.0.* https://amecorg.com/2020/07/barcelona-principles-3-0/

Anaya, L., Stafford, F., & Zamarro, G. (2021). Gender gaps in math performance, perceived mathematical ability and college STEM education: the role of parental occupation. *Education Economics, 30*(2), 113-128. https://doi.org/10.1080/09645292.2021.1974344

Bandura A. (1997). *Self-efficacy: The exercise of control.* Freeman.

Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology, 3*(3), 265-299. https://doi.org/10.1207/S1532785XMEP0303_03

Baus, R.D., & Welch, S.A. (2008). Communication students' mathematics anxiety: Implications for research methods instruction. *Communication Research Reports, 25*(4), 289-299. https://doi.org/10.1080/08824090802440196

Bayliss, L. (2020). Demystifying data: A constructivist approach to teaching statistical concepts using SPSS. *Journal of Public Relations Education, 6*(1), 58-84. https://journalofpreducation.com/2020/01/21/demystifying-data-a-constructivist-approach-to-teaching-statistical-concepts-using-spss/

Beilock, S. L., Gunderson, E. A., Ramirez, G., & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. *Proceedings of the National Academy of Sciences, 107*(5), 1860–1863. https://doi.org/10.1073/pnas.0910967107

Borghi, A. M., Binkofski, F., Castelfranchi, C., Cimatti, F., Scorolli, C., & Tummolini, L. (2017). The challenge of abstract concepts. *Psychological Bulletin, 143*(3), 263–292. https://doi.org/10.1037/bul0000089

Bowen, S. A. (2003). 'I thought it would be more glamorous': preconceptions and misconceptions among students in the public relations principles course. *Public Relations Review, 29*(2), 199-214. https://doi.org/10.1016/S0363-8111(03)00012-2

CPRE (2023). Navigating change: Recommendations for advancing undergraduate public relations education. *Commission on Public Relations Education*. https://www.commissionpred.org/wp-content/uploads/2023/10/CPRE-50th-Anniversary-Report-FInal-Final.pdf

DiMaggio, P. (1997). Culture and cognition. *Annual Review of Sociology, 23*, 263–287. https://doi.org/10.1146/annurev.soc.23.1.263

Ellingson, L. L. (2012). Interview as embodied communication. In J. F. Gubrium, J. A. Holstein, A. B. Marvasti, & K. D. McKinney (Eds.), *The SAGE handbook of interview research: The complexity of the craft* (2nd ed., pp. 525–539). SAGE Publications.

Evans, G. W. (2004). The environment of childhood poverty. *American Psychologist, 59*(2), 77–92. https://doi.org/10.1037/0003-066X.59.2.77

Forrester (2022). *Building data literacy: The key to better decisions, greater productivity, and data-driven organizations*. https://www.tableau.com/sites/default/files/2022-03/Forrester_Building_Data_Literacy_Tableau_Mar2022.pdf

Grunig, J. E. (2006). Furnishing the edifice: Ongoing research on public relations as a strategic management function. *Journal of Public Relations Research, 18*(2), 151-176. https://doi.org/10.1207/s1532754xjprr1802_5

Hay, I., Stevenson, Y., & Winn, S. (2021). *Development of the self-efficacy effort in mathematics scale and its relationship to gender, achievement, and self-concept* [Conference Paper]. Annual Meeting of the Mathematics Education Research Group of Australasia (MERGA). https://files.eric.ed.gov/fulltext/ED623688.pdf

Jain, S., & Dowson, M. (2009). Mathematics anxiety as a function of multidimensional self-regulation and self-efficacy. *Contemporary Educational Psychology, 34*(3), 240–249. https://doi.org/10.1016/j.cedpsych.2009.05.004

Jaye, J. R. (2016). *Adding it all up: Why 'I hate math' needs to be removed from the PR lexicon*. PR Say. https://prsay.prsa.org/2016/03/01/adding-it-all-up-why-i-hate-math-needs-to-be-removed-from-the-pr-lexicon/

Kim, J., Shin, Y.-J., & Park, D. (2023). Peer network in math anxiety: A longitudinal social network approach. *Journal of Experimental Child Psychology, 232*, 105672. https://doi.org/10.1016/j.jecp.2023.105672

Kreilkamp, T. (1970). *The dimensions of psychological distance*. [Doctoral dissertation, New York University]. ProQuest Dissertations Publishing. https://www.proquest.com/docview/302434871?pq-origsite=gscholar&fromopenview=true&sourcetype=Dissertations%20&%20Theses

Kreilkamp, T. (1984). Psychological closeness. American *Behavioral Scientist, 27*(6), 771-784. https://doi.org/10.1177/000276484027006008

Laskin & Sisco (2015, Spring). Math apprehension of public relations students: An experiment. *Teaching Public Relations, 91*, 1-4. https://aejmc.us/prd/wp-content/uploads/sites/23/2015/01/tpr91win15.pdf

Lindlof, T. R., & Taylor, B. C. (2017). *Qualitative communication research methods* (4th ed.). SAGE Publications.

Magnuson, K. A., Meyers, M. K., Ruhm, C. J., & Waldfogel, J. (2004). Inequality in preschool education and school readiness. *American Educational Research Journal, 41*(1), 115–157. https://doi.org/10.3102/00028312041001115

Maier, S.R., & Curtin, P.A. (2005). Self-efficacy theory: A prescriptive model for teaching research methods. *Journalism & Mass Communication Educator, 59*(4), 352–364. https://doi.org/10.1177/107769580405900405

Manley, D., & Valin, J. (2017). Laying the foundation for a global body of knowledge in public relations and communications management. *Public Relations Review, 43*(1), 56–70. https://doi.org/10.1016/j.pubrev.2016.10.018

Meador, A., & Salazar, L. R. (2023). The effects of math anxiety on the performance of undergraduate business majors using self-efficacy as a mediator. *International Journal of Teaching and Learning in Higher Education, 35*(2), 147–159. https://docs.lib.purdue.edu/ijtlhe/vol35/iss2/14/

Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology, 82*, 60–70. https://doi.org/10.1037/0022-0663.82.1.60

Miller, P., & Votruba-Drzal, E. (2013). Early academic skills and childhood experiences across the urban–rural continuum. *Early Childhood Research Quarterly, 28*(2), 234-248. https://doi.org/10.1016/j.ecresq.2012.12.005

O'Neil, J., Kinsky, E. S., Ewing, M. E., & Russell, M. (2023). You don't have to become a data scientist:" Practitioner recommendations for cultivating PR student data competency. *Journal of Public Relations Education, 9*(1), 62-81. https://journalofpreducation.com/?p=3616

Plowman, K. D., Forde, J. E., Rawlins, B. L., Puglisi, G., & Turk, J. V. (2022). Public relations graduates' perceptions of their degrees and careers: A five-university survey. *Journal of Public Relations Education, 31*(3), https://journalofpreducation.com/wp-content/uploads/2022/12/712af-public-relations-graduates-perceptions-of-their-degrees-and-careers.pdf

Ramirez, G., Shaw, S. T., & Maloney, E. A. (2018). Math anxiety: Past research, promising interventions, and a new interpretation framework. *Educational Psychologist, 53*(3), 145–164. https://doi.org/10.1080/00461520.2018.1447384

Rancer, A. S., Durbin, J. M., & Lin, Y. (2013). Teaching communication research methods: Student perceptions of topic difficulty, topic understanding, and their relationship with math anxiety. *Communication Research Reports, 30*(3), 242–251. https://doi.org/10.1080/08824096.2013.806259

Ryan, G. W., & Bernard, H. R. (2003). Techniques to identify themes. *Field Methods, 15*(1), 85–109. https://doi.org/10.1177/1525822X02239569

Schaeffer, M. W., Rozek, C. S., Maloney, E. A., Berkowitz, T., Levine, S. C., & Beilock, S. L. (2021). Elementary school teachers' math anxiety and students' math learning: A large-scale replication. *Developmental Science, 24*(4), e13080. https://doi.org/10.1111/desc.13080

Shen, B. S. P. (1975). Science literacy and the public understanding of science. In S. B. Day (Ed.), *Communication of scientific information* (pp. 44–52). Karger.

Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. *Advances in Experimental Social Psychology, 38*, 183–242. https://doi.org/10.1016/S0065-2601(06)38004-5

Spicer, C. H. (2009). Images of public relations in print media. *Journal of Public Relations Research, 5*(1), 47-61. https://doi.org/10.1207/s1532754xjprr0501_03

Stadthagen-Gonzalez, H., & Davis, C. J. (2006). The Bristol norms for age of acquisition, imageability, and familiarity. *Behavior Research Methods, 38*(4), 598–605. http://doi.org/10.3758/bf03193891

Tallapragada, M., Hardy, B. W., Lybrand, E. G., & Hallman, W. K. (2021). Impact of abstract versus concrete conceptualization of genetic modification (GM) technology on public perceptions. *Risk Analysis, 41*(6), 976-991. https://doi.org/10.1111/risa.13591

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review, 117*(2), 440–463. https://doi.org/10.1037/a0018963

Tovey, T. L. S., Kelly, S., & Brown, W. (2022). The relationships among locus of control, the impostor phenomenon, and math anxiety in business majors. *International Journal for Business Education, 163*(1), 1-13. https://doi.org/10.30707/IJBE163.1.1660590612.882591

Yoon, Y., & Black, H. (2011). Learning about public relations from television: How is the profession portrayed? *Communication Science, 2*,85–106. http://www.ijpc.org/uploads/files/youngminyoon%20article.pdf

Young, C. B., Wu, S. S., & Menon, V. (2012). The neurodevelopmental basis of math anxiety. *Psychological Science, 23*(5), 492–501. https://doi.org/10.1177/0956797611429134