

**AN INCLUSIVE APPROACH TO HOW FINANCIAL  
INSTITUTIONS MIGHT DESIGN FINANCIAL  
INFORMATION FOR NEURODIVERSITY  
ACCESSIBILITY**

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## **Abstract**

Many Canadians are seeking tools and advice to help them feel more hopeful about their financial future. The one size fits all tools that financial institutions are producing fall short of meeting the needs of economically stressed Canadians. This is particularly true for the increasingly large and often overlooked group of neurodivergent customers who feel that financial tools are not designed to meet their needs. In fact, they describe financial information as being typically taught and presented in ways which are overwhelming and confusing given the way they process information. While financial institutions have begun to understand the value of neurodivergence, or thinking differently, in the workplace, they are slow to understand the unmet needs of their neurodivergent customers. Our research focuses on increasing awareness about how neurodivergent individuals learn and like to receive financial information, and how banks can design financial information for neurodiversity accessibility. Doing so will make money management easier for everyone. This presents an important design opportunity for banks that will not only help their customers but can improve greater economic wellness in the community. We used a human-centred design approach to gain a deeper understanding of the accessibility requirements, barriers to money management, and the lived experiences trying to use banking tools or services of persons who self-identified as being neurodivergent. Financial wellness is possible, by designing financial tools that minimize cognitive fatigue and overwhelm, accommodate visual learning, and that help to minimize fear and anxiety. Designing tools that are accessible and useful for the neurodiverse community also make money management easier for everyone else.

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# Chapter 1: Introduction & Literature Review

Economic volatility has left Canadians worried about money more than anything else (FP Canada, 2022). While financial experts and institutions seek to educate and assist Canadians towards financial wellness, they frequently overlook the needs of neurodiverse customers leaving a huge gap in the financial knowledge and wellness of Canadians and a missed opportunity for financial institutions. To help advocate for the needs of neurodiverse customers we have focused this MRP on understanding and bringing awareness to the money management needs of neurodiverse individuals and exploring how financial institutions might design financial information for neurodiversity accessibility so that every Canadian can achieve financial health. While money stress is not new, the impact of financial worry is now compounded by the added layers of stress and financial uncertainty the Covid-19 pandemic has shroud upon Canadians. While hundreds of budgeting tools and financial technology options exist, their one size fits all designs fall short of helping or empowering those with ways of thinking, learning and communicating that are different from what is considered the cognitive norm or neurotypical. Neurodiverse individuals who think and learn in unique ways are particularly overwhelmed and disengaged by their banking and money management practices. This has an enormous impact on the economic health of our country. Fifteen percent of the global population and 600,000 Canadian identify as neurodivergent (Bitti, 2022). This large and growing percentage of the population live with mostly invisible disabilities that are often overlooked by the financial industry. Yet, the economic impact of citizens disengaged with money management has significantly implications. It is imperative that financial institutions find ways to design information and tools that empower neurodivergent thinkers. Our research aims to bring awareness to the ways neurodiversity impacts money management and to encourage financial institutions to design financial information for neurodiversity accessibility while taking into consideration unique learning styles.

As the world grapples with soaring interest rates, high cost of goods, job loss, and market volatility, finance-related stress is leading to anxiety, depression and feeling less hopeful about the future (FP Canada, 2022), which is negatively impacting overall societal well-being. Those with a decent understanding of budgeting and money matters and the ability to adhere to money management rules and processes may have the tools to survive the economic downturn. Still, the alarming reality is that more than 60% of adults rate their financial knowledge and ability to budget money as fair or poor (Siddall, 2022). People struggle to understand their finances, but they don't all struggle in the same way. There is a large group of individuals for whom learning about finance and managing money is made difficult because they think and process in ways that are different from what we typically understand. Yet, financial information and tools are presented and designed to suit one style of processing information. These individuals are described as being neurodiverse – they experience, interact with, and interpret the world in unique ways. This includes people with autism, ADHD, Tourettes, dyslexia and a range of other neurodiverse conditions who process information differently, struggling to engage with confusing and overwhelming financial tools “Neurodiversity Definitions and Different Types” (2020). Not only do we not know exactly how many people are neurodiverse, but many people who are neurodiverse don't know it. It is no wonder that financial tools have not yet been designed for neurodiversity, but the time has come.

A one size fits all approach for financial products, services and information is not designed to accommodate the diversity of our human brains, leaving many people struggling to understand and manage personal finance. This is not only negatively affecting personal well-being and societal economic vulnerability, but it also represents a missed opportunity for banks. We believe financial institutions have a responsibility and an opportunity to accommodate and design for physical diversity and the diversity of thinking and learning. People with disabilities represent a market worth \$1 trillion and one of the biggest potential client bases in the world (Musiitwa, 2018). The impact of neurodiversity is largely unseen but deeply felt.

The COVID-19 pandemic launched an increase in online and mobile banking, with little attention to accessible or user-centred design. While clunky or poorly designed banking applications and experiences are frustrating for everyone, they can present complete barriers to those with neurodivergent conditions such as autism, ADHD, social anxiety and others. There is now a great deal of pressure on private and public sector organizations to demonstrate proactivity when it comes to digital accessibility for customers. Companies need to demonstrate that their platforms, services, and physical branches are suitable for everyone – including those that are neurodivergent (Graham, 2021). This is a great opportunity for banks to offer wisdom and guidance to help neurodivergent customers make sound decisions and manage money with confidence.

# Literature Review

## The Neurodiversity Paradigm

For many generations, autistic individuals' mental, developmental, and cognitive disability was pathologized, and they were considered medically abnormal. Attempts were made to “treat” or “cure” their autism, often at a traumatic cost to these individuals and their families (Aftab, 2022). Eventually, autistic individuals began to voice their discontentment with being represented as deviations from “normal”, which led us to challenge our assumptions about normality. Awareness about neurological diversity began to take hold in 1998 through the ground-breaking work of Australian sociologist Judy Singer. Singer, who describes herself as “somewhere on the autistic spectrum” published the first academic sociological inquiry into the growing Autistic Self-Advocacy Movement and conceptualized the term *Neurodiversity* to give a name and a voice to this movement (Craft, 2019). A movement that was not only representative of autistic individuals but was attracting other neuro-minority groups such as those labelled with ADHD, ADD, OCD and more (Doyle, 2023). This Neurodiversity Movement spoke a language understood by those for whom it was advocating and spoke logic and reason to the broader audience, helping them see neurodiversity not as a pathology that marginalizes people but as a necessary cognitive biodiversity to the ecosystem. As the world learned new ways of thinking about neurodiversity socially and politically, it became a powerful minority rights campaign. Culture started to shift in corporations as major companies changed their hiring practices, work environments, and human resource policies which recognize the strengths and value of neurodiversity.

The neurodiversity paradigm is like the change seen in the LGBTQ community, away from pathologizing, toward pride, acceptance and inclusion (Aftab, 2022).

As the neurodiversity paradigm redesigns scientific enquiry from simply scanning brains in search of what is broken to questioning homogeneity of thought, Dr. Helen Taylor's theory of *Complementary Cognition* explains that humans adapt and evolve through a system of collective cognition. Having neurocognitively different ways of searching for

information helps our species adapt. Dr. Taylor advocates for the need for society to be aware of the importance of neurodiversity and urges us to design and build systems from education to the economy that nurture different ways of thinking (Taylor, 2021).

This neurodiversity paradigm shifts the narrative from “what is wrong with this individual” to “what social barriers are turning difference into disability and exclusion” (Doyle, 2022)

Many people with neurological conditions have extraordinary skills, including pattern recognition, memory, and mathematics. Yet they often struggle with banking and how financial information is presented. Poorly presented information might be annoying to some people, but it can greatly impact the day-to-day finances of those who have great difficulty interpreting or absorbing the information. This affects their ability to stay on track to meet their financial goals and to have the freedom to make choices that support financial health. As the research and understanding of brain science advance the number of people defined as neurodiverse continues to increase, with some studies identifying nearly 30 percent of the population as neurodiverse, such as individuals with attention deficit hyperactivity disorder (ADHD), dyslexia, dyspraxia, as well as people on the autism spectrum, among others (Wood, 2021).

We live in a time of increased neurodivergence and awareness about ADHD, Dyslexia, Autism and other neurological states. Banks are amongst the major corporations that recognize the value and strengths neurodiversity brings to their workforce and have begun to broaden their focus on accessibility to incorporate the needs of neurodivergent employees. While banks also recognize that a large percentage of their customers are neurodiverse and aim to address their needs, they have been slower to design products, services, and experiences around the needs of neurodiverse individuals. Yet learning disabilities such as dyscalculia, dyslexia, dysgraphia, brain injuries, social anxiety, and attention deficit disorders can make managing and learning about money difficult and utterly overwhelming. It is incumbent upon financial institutions to improve not only accessibility for neurodiverse customers but also their experiences with financial education, digital products and the in-person experience at bank branches through co-design.

## Impact of Diverse Learning Styles on Money Management

Everyone learns differently, yet few of us spend much time thinking about how we learn and rarely, if ever, think about how our learning style affects the way we manage money. We all learn differently, and no single money management fits us all. There is value in understanding how each of us learns so we may seek the best way to understand and experience personal finance.

The Vark Model (Visual, Aural, Read/Write, Kinesthetic) describes the sensory modalities used for learning:

Visual learners learn best when they can see pictures and images. Graphs, charts and other visualizations of their money will help them see where their money is going and how it's being spent. In fact, about 65% of Americans are visual learners (Fox, 2019). To date, several studies have been conducted which prove the power of visual aids in eLearning. And there are some interesting results drawn from them. Such as, learners respond to visual information faster as compared to text-only materials. Also, visuals help improve learning tremendously and on multiple levels. Roughly 65% of the population comprises visual learners (Jandhyala, 2017).

Auditory learners absorb information by listening. Unfortunately, there aren't a lot of budgeting strategies that take this learning style into account. By its very nature, a budget is visual (Walborsky, 2015). When it comes to e-learning, individuals with dyslexia often benefit from voice-over. Because they won't have to read onscreen text, they will more clearly process the content. Likewise, allowing learners to wear headphones to focus on the course audio will minimize distractions for people with ADHD (Wood, 2021). Auditory learners might also set up budgeting reminders with a special ringtone on their phone or create a budgeting playlist that plays in the background every time they budget (Walborsky, 2015).

Read/Write, or Text learners are note-takers who perform strongly when referencing the written text. Focusing on the written word, reading and writing learners succeed with written information on worksheets, presentations and other print resources. They learn

best when they see something written down 4 *types of learning styles: Explaining the Vark model (2020)*.

Kinesthetic learners or Physical learners are individuals who need to be actively engaged in their learning. They are 'tactile' learners who use movement, testing, trial and error and a non-traditional learning environment to retain and recall information *Learning styles: Kinaesthetic Learner Characteristics - engage education: (2023)*. For these physical learners, hands-on education and carrying out the activity themselves is more effective than listening to an explanation *What are the 7 Different Learning Styles and do They Work? (2021)*. They prefer learning by doing and may have difficulty retaining information if they sit still to learn.

It is important to note that many people don't just learn in one way; other learning styles exist. Understanding how we learn can help us develop strategies for learning and practicing money management.

While most people don't really think about how they learn, educators do, and they strive to design courses for all types of learners so that everyone has access to learning, and everyone feels included. Optimizing teaching and learning based on how humans learn is part of *universal design*, an approach that advocates providing multiple means of engagement, representation, action, and expression *Accessibility, Universal Design for Learning & Supporting Neurodiverse Students (n.d)*. It minimizes the need for accommodation and reduces stigmatization.

Financial institutions would do well to focus on designing for neurodiversity as, very often, designing to help a particular group of people ends up helping everyone. For example, creating classroom routines helps students with autism know what to expect, giving them the predictability that they need, yet it helps all students feel secure. Other examples of universal design in education include might include using captions when you use video, or keeping text short, and being mindful of the use of colours and contrast. Examples of universal design in society include things like curb cut-outs and sidewalk ramps; while designed for people using wheelchairs, they help people using walkers, pushing strollers, or riding bicycles. Examples of universal design in banking

and finance are harder to find yet would offer great value for all. The easier financial management is for everyone, the more prosperous our society will be.

## **Impact of Neurodiversity in the Workplace**

The recent Harvard Business Review article “Neurodiversity is a Competitive Advantage” highlights the special skills bestowed upon those with neurodiverse conditions. Many have higher-than-average abilities, often in mathematics and software development, making them ideal candidates for technology or other employment, on paper. Yet their need for accommodations with things like headphones to prevent overstimulation or other perceived eccentricities has made it difficult for them to get through the interview process. Recently, companies are recognizing talent opportunities and are reforming their HR processes to accommodate neurodiversity in the workplace. This highlights the shift in awareness and acceptance that is happening as we move away from thinking neurodiversity needs to be “cured” toward it simply needing accommodation. Financial journals and websites describe how companies have begun to recognize that diversifying their workforce brings skills and innovation otherwise unseen and can be the differentiator companies need. Not only are companies hiring neurodiverse workforce, but they are also designing neurodiverse friendly workplaces and HR processes.

Canadian banks are starting to look at a human-centred approach to customer and employee journeys to ensure their customers and employees who are neurodivergent have access to good services and employment with dignity, inclusivity, independence and respect, but the process has been slow. It’s important for banks to start meeting the needs of neurodivergent individuals for several reasons; Individuals who identify as neurodivergent represent approximately 20% of the Canadian population, 22% of Canadians with disabilities, and over 50% of Canadians connected to disability in some way; this presents an opportunity for banks to serve and engage new clients *BNP Paribas in Canada collaborates with EY to expand workplace inclusion (2022)*. Increasing the accessibility of financial services is good for business and economic growth. According to research by Barclays, when customers with disabilities can



manage their money, economic vulnerability declines, and overall economic health improves. Recognizing that humans experience and interact with the world from a spectrum of thinking, learning, and behaviour, financial information should be offered in myriad ways that reflect this diversity. The exposure of systemic inequalities and injustices during the COVID-19 pandemic perpetuated a shift in workplace diversity, equity and inclusion policies and practices. Organizations are responding by feverishly hiring diversity professionals and incorporating solid diversity and inclusion initiatives into their culture. At the same time, businesses are harnessing the value of hiring employees with different thinking and learning styles. As recognition and understanding of unique learning styles and needs continue to flourish in the business world, we must consider how financial institutions can adapt their brands, products, and services to accommodate neurodiversity and ensure accessibility for all learners.

## **Impact of Neurodiversity on Financial Management**

Financial knowledge is a key foundation for building a healthy financial life, but little is known about the financial knowledge of neurodivergent individuals (Lurtz and Komarow, 2021). The neurodiverse population struggles with the same financial concerns as other underrepresented and underserved groups, and some of these include control of day-to-day and month-to-month finances, capacity to absorb financial shocks, being on track to meet financial goals and financial freedom to make choices that support quality of life (Lurtz and Komarow, 2021). While neurotypical people have similar money management struggles, they tend not to bear the same feelings of stigmatization or loss of how to gain control of their finances. The stress and emotional toll that can come with thinking about personal finances leave many people believing it is easier not to think about it! Procrastinating about budgeting and other non-preferred financial tasks is one of the financial challenges neurodiverse people might have. Curtis (2023) describes other financial challenges neurodiverse people may have trouble with, including remembering to pay bills on time, spending impulsively, or thinking to the future about why they should be putting money in savings and how.

## The Imperative to Design for Inclusivity in Financial Services

In a 2020 report, McKinsey described the business case for diversity, equity, and inclusion (DE&I) as being stronger than ever. The report showed that the relationship between diversity on executive teams and the likelihood of financial outperformance has strengthened over time and provided insights into how inclusion matters. In a Forbes article Cole (2020) describes why diversity and inclusion are essential in business. These include greater innovation and creativity, happier employees, increased productivity, a range of skills, more talent, higher revenues and a better understanding of customers.

While this movement towards awareness of the value of diversity pre-dates the pandemic, Covid accelerated it as a priority on moral and business grounds. The business imperative for inclusion is largely driven by consumer demand. A growing body of research indicates that consumers are taking their business to companies with a proven commitment to DE&I *Diversity and inclusion in banking and business: Why is it so important?* (2022) Recognizing that companies with diversity perform better and consumers want to do business with inclusive companies, it is imperative that companies design products and services for diverse consumers, and banks are no exception.

Prior to the Dodd-Frank Act, Wall Street's historical reform aimed to protect Americans from a financial crisis like the one experienced in 2008. The financial services sector was not very diverse, with few women or minorities in management. Such a lack of diversity in their workforce naturally results in a lack of diversity in financial products and services; thus, we're accustomed to the one size fits all approach to banking. However, as financial institutions shift their hiring practices, policies, and culture, they are also starting to look at their products and services and recognize that one size fits all products do not fit diverse consumer needs. They are missing the mark on a large market segment of customers.

Shifting culture takes time, and the financial sector is huge and steeped in tradition; as such, they are slowly working on their internal journey towards diversity and inclusion efforts. Still, we see signs that banks are starting to adopt a broader view of customers, including neurodiversity which had largely been invisible or ignored. Banks have started to partner with technology companies to design applications for accessibility. A look into the big 5 Canadian banks shows they have some awareness, and a foot in the right direction. However, they are admittedly early on in their journeys toward being universally accessible. At this stage, they are creating partnerships, raising awareness, and starting to design products for accessibility. Focusing on universal design would mitigate accessibility barriers and create seamless experiences for all customers. Minimizing the need to seek out and ask for accommodations would help reduce stigma. It is encouraging to hear banks starting to use the terminology of human-centred design and co-creation as this approach would help ensure they design to meet customer needs rather than accommodate for unmet needs. Below are some examples of how banks are approaching accessibility and diversity needs:

*Scotiabank* partnered with Fable Tech, a digital product testing company, to design an easy-to-understand mobile app centred around accessibility. Scotiabank has been acting on customer feedback and has launched a project to support customers who are Deaf and communicate in American Sign Language (ASL). They are eager to design for all individuals and communities, but we have not seen evidence of co-creation or user research with the neurodiverse community.

*CIBC* is committed to diversity through several community partnerships, including the BlackNorth initiative, Chicago Scholars, and Lime. They also have a commitment to meeting the needs of their clients with disabilities, including blind and low vision, motor and dexterity disabilities, deaf and hard of hearing or speech disabilities, neurodiversity and cognitive disabilities, and mental health. Accessibility for neurodivergent individuals includes plain language, service animals and support persons, and a partnership with MagnusCards which is a free app that helps people with cognitive disabilities to learn

life skills through storytelling (Figure 1). The app provides step-by-step visual guides and positive reinforcement.

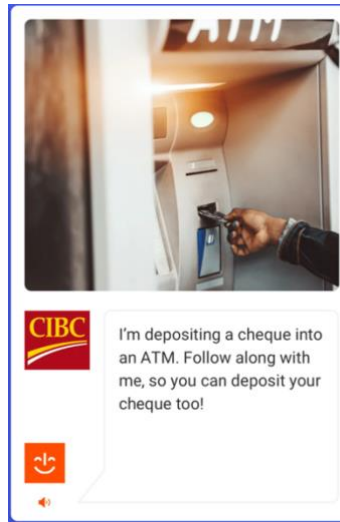


FIGURE 1: MAGNUSCARDS (SOURCE: CIBC, 2016)

Barclay's Bank has accessibility services designed for neurodiversity. Some ways Barclays accommodates neurodiversity is the option of logging in with a memorable word, branches have private meeting rooms and accessible, quiet areas, and longer appointments as requested, and high-visibility debit cards with 12 available designs help orient which end to insert in cash machines.

An increasing number of articles described the widespread application of financial technology (Fintech) within organizations that leverage technology to provide financial services. However, with the advancement of digital technology, financial services are also required to ensure that all their applications are accessibility compliant from a legal, moral, and business perspective. Fintech companies need to provide a chance to personalize financial services to people with disabilities *Best Practices for Accessibility and Inclusive Design in Financial Services* (2022). There was an increase in awareness of technology built for neurodivergent people following the Covid 19 pandemic, which led many companies to go digital. The sprint to digital during Covid resulted in some poor design and UX practices. While some won't notice, there was much learning that poor design can be a big obstacle for people who are neurodiverse.

## Human-centred design

There was a paucity of human-centred design (HCD) research in financial services. This is likely attributable to the newness of HCD to the financial sector. While Ernst & Young (EY) reported on a case study using HCD to improve the customer experience at a global bank, it was not focused on the needs of neurodivergent individuals. There is evidence of banks starting to look at a human-centred approach, as stated by Monica Ackermann, Director of Enterprise Accessibility, Digital Banking.

“The bank is starting to take a look at a holistic, all-bank approach — or a human centred approach — to customer and employee journeys to ensure our customers and our employees with disabilities have access to good services and employment with dignity, independence and respect,” *Covid-19 accelerates building out accessibility services for online banking* (2020).

However, as Ackermann points out, a human-centred approach is new, and banks are very early in their journey of discovery and design, particularly for neurodiversity which is experiencing its own reckoning. It is at this intersection of neurodiversity and inclusive financial design that we have focused our research.

## Chapter 2: Research Method & Findings

### Primary Research Question:

How might financial institutions design financial information for neurodiversity accessibility while taking into consideration unique learning styles?

### Secondary Research Questions:

Are current financial teaching methods inclusive of neurodiversity?

How do neurodivergent people prefer to engage with financial information?

Are financial institutions and UX designers creating accessible content and inclusive user experiences?

### Overview of Methods

This research was designed using a human-centred design (HCD) approach. HCD is defined as a creative approach to problem-solving. It is about cultivating deep empathy, generating ideas and testing them out. The iterative process starts with the people and ends with new purpose-built solutions to suit their needs. *What's the difference between human-centred design and design thinking?* (n.d). The HDC process, as described by design firm IDEO, includes discovering the needs of the people to frame the problem from their perspective, then generating ideas as to how the problem might be solved and, testing those ideas out in small batches, then implementing the ones that work. Due to the small sample size and time limitations, this study is limited to human-centred design's inspiration and ideation phases. Research findings are intended to inform financial institutions to some of the needs and insights of their neurodivergent customers and to provide a starting point for ideation.

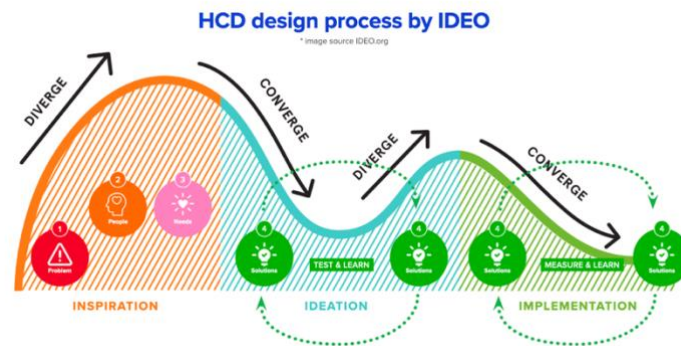


FIGURE 2: HUMAN-CENTRED DESIGN PROCESS (SOURCE: IDEO, 2018)

## Participant Selection

To ensure the quality of participant selection, we created recruitment material and a 15-question survey. Survey respondents had the option to volunteer to be interviewed. A screening process was used at the outset of interviews. Screening took place in the form of a casual conversation to ensure participants were in fact diagnosed as neurodivergent, or highly suspected they were. We asked them to briefly describe their money management style and habits. If meaningful contribution and fit was ascertained, consent was obtained, and the rest of the questions were posed. Secondary participants were not screened as they were recommended through a university contact. Ethics approval was obtained through the Research Ethics Board at OCADU prior to recruitment.

*Primary participants* - Neurodivergent adults aged 18 and above, who are either formally diagnosed, or identify as having a learning disability, attention deficit hyperactivity disorder, dyslexia, autism or other neurological states, and non-neurodivergent individuals.

*Secondary participants* - Individuals who work within the financial sector and have worked with neurodivergent employees or clients. They are referred bank employees.

# Data Collection

## Surveys

The quantitative research consisted of administering a survey aimed at helping the researchers discover whether the needs of neurodivergent individuals are being met when it comes to managing their money. The researchers created a survey through Microsoft Forms with 15 questions. The survey questions gave participants the option to self-identify as neurodiverse if they have a known diagnosis or have reason to believe they are neurodiverse. This enabled the researchers to assess the prevalence of qualitative findings specific to engaging and designing for neurodivergent individuals when it comes to financial information.

The researchers shared the survey through Instagram, the OCAD university bulletin board, LinkedIn, Slack and Teams work channels, and email introductions through past instructors. The survey was intended to be completed by only neurodivergent individuals; however, 31 of the 63 respondents were not aware of any learning differences, disorders or syndromes they may have. This created a comparison group within the research. However, it is important to note, that neurodivergent is a relatively new concept with an expanding definition and constantly evolving information. This results in many people not being aware of all the conditions that fall under the umbrella of neurodiversity, particularly newer additions like anxiety. Many people are, in fact, neurodivergent without being aware of it. The comparison group may therefore contain neurodivergent people.

Survey responses were collected and analyzed to understand demographics, patterns of learning styles, use of financial tools, levels of confidence, knowledge, and satisfaction with current money management.



## Neurodivergent User Interviews

Semi-structured interviews were conducted to gain insight into the money management and banking experiences of neurodivergent individuals while taking into consideration their unique learning styles. A total of 5 interviews were with individuals diagnosed as being neurodivergent. Each interview ran for about 45 minutes and was carried out virtually through Microsoft Teams, with one researcher asking questions and the other taking notes. Questions were designed to help the researchers to understand, capture and explore how neurodivergent individuals absorb and understand financial information, their behaviours and perspectives. This was helpful in uncovering common themes around how neurodivergent individuals grasp financial information and what makes it easier for them to understand and identify the barriers to feeling confident about finance.

All participants provided the researchers with consent and chose not to be identified by their real names. Upon completion of the interviews, all participants were thanked for their time and informed that the final publication would be shared with them if they were interested in viewing it. Of the five neurodivergent individuals the researchers interviewed –four shared that they have attention-deficit disorder – this is a term sometimes used for one of the presentations of attention deficit/hyperactivity disorder (ADHD). ADHD is a neurological disorder that causes a range of behaviour problems such as difficulties with attending to instruction, focusing on schoolwork, keeping up with assignments, following instructions, social interaction etc. (Logsdon, A.2007, July 7) and one participant shared that they have had a brain injury.

As researchers, we wanted to understand how neurodivergent individuals feel when they use financial tools or learn about money and why it makes them feel that way. Therefore, qualitative data from the survey was gathered and broken down into positive and negative emotions.

## **Financial Sector Employee Interviews**

Semi-structured interviews with financial sector employees provided insight into where banks are at with awareness, acceptance, and understanding of neurodiversity and what challenges they face in trying to broaden their inclusivity mandate. Bank employees worked at two of the five Canadian “big banks” in design research and communications roles. Interview questions were designed to understand employees’ understanding of neurodiversity, whether the term comes up in their work, and whether banks do a good job of making the experience of personal banking and financial learning accessible to neurodiverse individuals.

# RESULTS

## Survey data

The participants were adults ranging from 18 to over 80 years old with the majority in their 30s. The large majority are attending or have graduated from post-secondary education, with only 5 of 63 not having graduated from college or university. The group of survey participants was nearly evenly split with 32 identifying as neurodiverse and 31 indicating they were not aware of being neurodiverse. The researchers acknowledge it is possible that some of those participants may be neurodiverse, but not aware. Of the 32 participants who identified as neurodiverse 20 reported having Attention Deficit with Hyperactivity Disorder (ADHD), 10 had Attention Deficit Disorder (ADD), 7 had a learning disability, 6 had Obsessive Compulsive Disorder (OCD), 5 had sustained traumatic brain injuries (TBI), 4 had Dyslexia, 4 had Autism Spectrum Disorder (ASD), 2 had Asperger's Syndrome, 2 indicated an 'other' condition that was not specified, 1 had Tourette's, and 1 had Down Syndrome. It is possible to have more than one condition. There was a total of 63 respondents.

# Survey Results & Emerging Themes

## Use of Financial Tools

40 out of 63 participants use mobile apps as a money management tool with an even split between neurodivergent and neurotypical participants. Apps were by far the most widely used tool followed by online banking which was used by 18 out of 63 participants as seen in Table 1.

<b>Financial Tools Used</b>	<b>No. of neurodivergent responses</b>	<b>No. of neurotypical responses</b>
Mobile apps	20	20
Online banking	8	10
Family & friends	1	0
Excel	1	1
None of the ones listed	2	0

**TABLE 1. PRIMARY PARTICIPANT TABLE - TOOLS**

## Theme 1: Preferred tools

### Mobile application accessibility and inclusivity is desired and required

The Coronavirus pandemic increased our collective screen time, particularly on mobile devices; given that people are spending more time on mobile applications than ever before, we were not surprised to see that the most widely used financial tool used by participants is the mobile application (Perez, 2021). It was concerning to learn however that many mobile digital products are not accessible, resulting in lost business opportunities and potential legal issues for owners (Ronen, 2023). Sadly, when it comes to meeting basic accessibility standards, many banking apps are falling short.

Since 2018, it has become best practice for Title III entities, as defined by the Americans with Disabilities Act, to meet their accessibility requirements through the Web Content Accessibility Guideline (WCAG). However, a 2021 audit of 30 major US banking institutions by Texthelp, a software company specializing in literacy and

accessibility technology, found that many apps failed to meet basic WCAG requirements. The failings discovered in the Texthelp audit generally fell into two categories: site design or coding errors and readability issues just to mention a few (Wester, 2022). Therefore, it is time for mobile app developers, designers and businesses to account for more accessibility within the online space. Going forward, the advent of inclusive mobile apps creates an opportunity not just for neurodivergent individuals but for everyone to navigate the software better and increase their visibility and representation in public arenas, thus making mobile accessibility a win-win.

## Happiness with money management

Table 2 shows that only 16 out of 63 participants indicated that they are happy with their current level of money management. Most of the participants reported feeling dissatisfied with their money management, or aspects of it.

Happiness with level of current money management	No. of Neurodivergent responses	No. of Neurotypical responses
Yes	8	8
No	11	10
Some of it is working, some of it needs help	13	13

**TABLE 2. PRIMARY PARTICIPANT TABLE – CURRENT MONEY MANAGEMENT**

## Theme 2: Happiness level

### One size fits all money management leaves most people unhappy

Money management can be tough for anyone. Neurodiverse and neurotypical people have similar money management struggles as everyone else (Curtis, 2023). This is in line with our survey results in Table 2. Even though the survey results are closely matched between neurodivergent individuals and our control group, the financial concerns of neurodivergent individuals, as they affect day-to-day living, are greatly understudied (Zamora et al, 2017). Research from the Journal of Neural Transmission has highlighted those individuals in the ADHD and autistic community are more likely to struggle when managing personal finances and investments due to factors such as impulse control, attention deficits and anxiety. (Duthie, 2023). Neurodivergent people are more likely to be in debt than neurotypical people and feel less confident about managing their money, according to new research. (McGowan, 2023).

In 2019, the Journal of Consulting and Clinical Psychology studied neurodiverse children's long-term money habits. The study found that by age 30, people with ADHD

had a lower monthly income, less money in savings, and regularly received more financial support from others than those aged 25 without ADHD. Often young adults with neurodiverse conditions will struggle to transition into adulthood and its financial requirements because of their inability to manage their money (Joseph, 2021) It is important to note that previous work regarding the financial lives of individuals with neurodiversity demonstrates that many of these individuals need to acquire basic financial knowledge to help manage and earn money without losing benefits (Lurtz & Komarow, 2021) Therefore, one-size-fits-all financial advice can leave neurodivergent people struggling with their finances, feeling stigmatized or at a loss for how to control their finances. But financial wellness is possible by leaning on resources that target the neurodiverse community and making strategic use of financial tools.

*“I find that neurodiverse people tend to have similar difficulties to everybody else, but in different ways,” she said. “For example, some neurodiverse people may have trouble with ‘future thinking,’ trouble thinking about why they should be putting money in savings and how.” - certified financial planner Elizabeth Yoder (Curtis,2023)*

## Learning style

Visual learning was the most identified learning style. 33 of 63 respondents identified as visual learners. The second most identified style of learning is physical (learning by doing) with 21 combined neurodivergent and neurotypical responses. Note that respondents could select more than one style of learning.

<b>Description of learning style</b>	<b>No. of neurodivergent responses</b>	<b>No. of neurotypical responses</b>
Visual	14	19
Auditory	5	3
Physical	7	15
Text	3	7
Numerical	1	2
Don't know	2	0

**TABLE 3. PRIMARY PARTICIPANT TABLE – LEARNING STYLE**



## **Theme 3: Style of learning**

### **Visual learning is very common, particularly among neurodivergent individuals**

Banking tools, education, and services are designed and presented primarily in textual and numerical form while statistics show that 65 percent of the population are visual learners, meaning they need to see information to retain it (Jawed et al., 2019). For visual learners, trying to sift through copious text or interpreting numerical information, cognitive fatigue and overwhelm set in quickly. Visuals add a component to communication that written and verbal methods do not: speed. Studies have shown that the brain can process images and videos 60,000 times faster than text, making image-based communication remarkably valuable (Spencer, 2018).

*“Numbers and jargon and other financial concepts aren’t as intuitive for me but things like images, sketches [and] graphics are much more easy to digest,” said Hay, founder and CEO of Napkin Finance. (Fox, 2019)*

Complex and exhaustive financial documents with technical jargon make it difficult for clients to understand and may discourage them. Visual supports carrying useful information in a lighter form are now becoming key for client retention across the industry (Tandon, 2021). Identifying unique learning styles to tailor your approach when delivering new information is tied to customer service. Being neurodiverse can affect how websites look and how one interacts with the user interface. Some things people with neurodivergent conditions find challenging include difficulty concentrating or staying focused, information or sensory overload, which can cause problems with ‘visual noise,’ and difficulty understanding colour schemes or patterns. (Ashford, 2022)

### **Preferred sources for learning financial information**

Both neurodivergent and neurotypical respondents identified that their preferred way to learn about financial information is from family and friends. Many respondents choose paid financial advisors to help them learn how to manage their money.

<b>Preferred source for learning financial information</b>	<b>No. of neurodivergent responses</b>	<b>No. of neurotypical responses</b>
Watch videos (YouTube, bank videos etc.)	13	6
Listen to podcasts	1	8
Doing on my own	10	11
Taking courses	10	3
Watching reels (TikTok, Instagram)	4	1
Family and friends	19	16
Paid financial advisor	11	12
Other	3	9

**TABLE 4. PRIMARY PARTICIPANT TABLE – LEARNING METHODS**

## Theme 4: Source of learning

**People prefer the comfort and safety of learning about financial information from trusted family and friends.**

In Canada, there are myriad avenues Canadians can pursue to seek advice on topics like retirement planning, tax, insurance, debt management and general financial knowledge. Canadians frequently get their financial advice from multiple sources. Canadians between 18 and 34 are more likely to ask friends or family members (59%) or use the Internet (51%). In contrast, Canadians aged 65 and older are more likely to seek advice from a financial advisor or planner (51%) or a bank (41%). (Gouvernement du Canada. 2023). Similarly, in the U.S., according to a recent CreditCards.com survey, 37% of American adults learn about finances from friends and families. Neurodivergent individuals seek family financial assistance. 48% of people who have developmental language disorder (vs. 16% of age-matched peers) reported that they draw on support, primarily from parents, in various financial tasks, including paying bills, choosing financial products, and taking loans from family or friends which aligns with our survey results in Table 4 (Winstanley, et al, 2018)

16 of 31 neurodivergent individuals disagree or strongly disagree that banks do a good job of presenting information in ways that make sense to them or that make them feel confident. This sentiment was shared by 17 of 30 neurotypical respondents.

<b>Level of agreement that financial institutions do a good job presenting information, products, and services in a way that makes sense and makes me feel confident about managing money</b>	<b>No. of neurodivergent responses</b>	<b>No. of neurotypical responses</b>
Strongly agree	3	0
Agree	4	5
Neither agree nor disagree	8	8
Disagree	11	9
Strongly disagree	5	8

**TABLE 5. PRIMARY PARTICIPANT TABLE – INFORMATION PRESENTATION**

## Theme 5: Presentation

### **Unclear or unappealing presentation of banking information affects people’s confidence about money management.**

When information is overwhelming; we tend to shut down and avoid looking at it. Many participants described the cognitive work of processing information not presented in a way that makes sense to them or in a way that they want to see it as cognitively exhausting. Some neurodiverse conditions, such as ADHD, affect executive functioning, making it particularly difficult to process banking information and manage money. In contrast, other conditions, such as brain injuries, impact the way people see and interpret letters and numbers which can cause errors and confusion.

### **Level of financial knowledge**

16 of 32 neurodivergent individuals reported being able to manage the basics of day-to-day money management, but not long-term investing. 13 of 30 neurotypical respondents also reported basic day-to-day knowledge. Only 10 respondents of the 63 felt that they have good or excellent knowledge of money management that they feel confident about, with 4 of them being neurodivergent. 3 respondents don’t feel like they understand how money works or how to manage it; it is a mystery to them.

<b>Level of knowledge about personal finance</b>	<b>No. of neurodivergent responses</b>	<b>No. of neurotypical responses</b>
It’s a mystery! I don’t feel like I understand how money works or how to manage it	2	1
I can manage the basics of day-to-day money management, but not long-term investing	16	13
I understand basic day to day and basic long-term investing options and strategies	10	10
I have good knowledge. I feel confident that I can manage my money well into the future	2	4
I have excellent knowledge. I could even teach others how to manage money.	2	2

**TABLE 6. PRIMARY PARTICIPANT TABLE – LEVEL OF KNOWLEDGE**

## Theme 6: Knowledge

**There is a low level of knowledge about long-term investing and lack of confidence about managing money into the future.**

The challenges of becoming financially literate are twofold for neurodiverse people. Firstly, someone with a learning disability's family might have handled their money for them to help them instead of educating them about how money works. Then, when it comes time to emancipate, neurodiverse young adults haven't had as much experience as others in making change, sticking to a budget, paying bills on time and understanding cash flow (Longero, 2022).

## Theme 7: Frequency of looking at financial information

**Overwhelming financial information causes people to shut down and avoid looking at it.**

10 of 30 neurodivergent individuals reported looking at financial information as little as possible due to the stress it induces. Only 4 neurodivergent individuals reported tracking financial information daily compared to 8 neurotypical individuals. Weekly tracking was most common in the neurotypical group.

Frequency of looking at financial information	No. of neurodivergent responses	No. of neurotypical responses
Everyday. I love keeping track of it	4	8
Once a week so I don't lose track	8	9
Once a month, because I have to	8	7
As little as possible. It is too stressful	10	7

**TABLE 7. PRIMARY PARTICIPANT TABLE - FREQUENCY**

When financial information is overwhelming and confusing to look at, people tend to shut down and avoid looking at it. Avoidance leads neurodivergent individuals to have difficulty keeping up with their financial information. Thus, impacting their financial health. It can be easy for neurodivergent individuals to forget things if they aren't

constantly reminded, particularly those with ADHD. This out-of-sight, out-of-mind perspective can be a challenge for neurodivergent individuals, as their bank balance might not be front of mind, even when talking about or spending money (Duthie, 2023). Avoidance further reinforces the challenge of forgetfulness.

## **Qualitative results**

Interviews took place from November 2022 to December 2022. Researchers analyzed the data and extracted themes. The following are themes, descriptions of the themes, and supporting quotations to help financial institutions plan future products, services, and educational tools for all their customers, including those who are neurodiverse. Confidentiality was ensured to enable open discussion while protecting sensitive issues.

### **Emerging Themes from Neurodiverse Participant Interviews**

#### **Theme 1: Financial Education**

##### **Financial Education is Missing the Mark**

Many participants described disappointment with the way financial information and money management was taught to them if it was taught at all. They described it as being taught in a very narrow way. Those receiving government funding felt that it was difficult to understand the funding and expressed a desire for banks to help them understand it. Given the large proportion of visual learners, it was not surprising to hear the desire for visual learning, stating that pictures of how to pay bills etc., would help.

One participant reflected on her experiences as a woman learning about math and the beliefs women often have that they are not good at numbers. She expressed the belief that women lack confidence with numbers as this belief is manifested socially. She also believed finance should be taught earlier in children's lives.

Participants described preferring to learn about finances from family and friends. Not only can they trust family and friends, but they also found family and friends have the patience to explain things in nice, simple ways. Some participants have taken some investing courses to better understand and be able to manage things on their own.

The following quotes reflect the feelings of neurodivergent individuals who are dissatisfied with the way financial information is taught to them:

*“Teach finance so I can understand it, not be afraid of it” - neurodivergent participant*

*“We are going to think differently. Should show different ways of learning and seeing things” - neurodivergent participant*

## **Theme 2: Cognitive Capacity**

### **Banking is Cognitively Exhausting**

Banking tools, education, and services are designed and presented primarily in textual and numerical form while according to statistics 65 percent of the population are visual learners (Jawed et al., 2019) and visual learner was the highest response from our neurodivergent participants. For visual learners, cognitive fatigue and overwhelm set in quickly when trying to sift through copious text or interpret numerical information. When information is overwhelming, we tend to shut down and avoid looking at it. Many participants described the cognitive work of processing information not presented in a way that makes sense to them or that they want to see it as cognitively exhausting. Some neurodiverse conditions, such as ADHD, affect executive functioning, making it particularly difficult to process banking information and manage money. In contrast other conditions, such as brain injuries, impact the way people see and interpret letters and numbers.

### **Participants described the cognitive burden in the following ways:**

#### ***Difficulty processing & calculating***

Physically, they experienced cognitive capacity limitations that included difficulty processing and calculating. It takes more time to process information or calculate numbers.

#### ***Difficulty finding things***

Participants described difficulty finding things on a page, impulsivity that impacts their



spending, difficulty remembering to pay bills, and a lack of common sense or intuition that other people can count on to help them figure things out.

### ***Visual impact***

Many participants described looking at printed statements as a lot of work and quite overwhelming; many just don't look at their statements. Seeing 'technical' information was not desired, instead, they wanted to see their spending. As visual learners, they wanted the experience of banking to be easy to understand visually and to have a pleasing aesthetic as they found current banking information looks 'ugly.' There was a negative feeling around seeing financial numbers boldly in red. One participant stated that they are "already feeling like I'm not meeting my financial goals; I don't need to see it boldly in red."

### ***Psychological***

Opening financial statements and banking apps creates a psychological impression, and neurodivergent individuals described wanting the reality of their finances "softened" for them. They don't want to see the "bottom line" first off, as it creates a sense of gloom or worry. They would rather be greeted with something uplifting and inspiring. The term 'net worth' was not appreciated. This may be associated with feelings of judgement and with the expressed fear of not having enough money.

### ***Forgetfulness***

Participants described ways in which their neurodiversity can cause forgetfulness leading to forgetting passwords, which stores they shopped in, forgetting to pay bills or complete other financial transactions, forgetting where they wrote things down and can forget what acronyms and symbols represent which makes everything confusing.

### ***Impulsivity***

Some types of neurodiversity, such as attention deficit with hyperactivity disorder (ADHD) and brain injuries, can be associated with varying levels of impulsivity. Participants described impulsivity as affecting their spending habits; they just buy things

impulsively. One participant expressed a desire for banks to help people who are neurodivergent by flagging an abundance of withdrawals and checking in on those customers.

### ***Cognitive fatigue & confusion***

Neurodiversity can affect the ability to be on screen, particularly in the case of brain injuries. After a long day, cognitive capacity is limited and finding things on a page becomes difficult. Typically logical things can become confusing, such as the difference between “interact eTransfer” and “make a transfer” as options on TD web.

Participants expressed frustration and confusion when trying to engage with personal finance, which led to fatigue. When fatigued, letters and numbers can reverse themselves (see b as a p, or 6 as a 9) this worsens with rows of numbers. Better to have spacing, colour coding, or some other strategy to mitigate this.

Cognitive effort is strained and overloaded by non-user-friendly text, acronyms, symbols, and unfamiliar codes leading to fatigue and frustration and more confusion. Filling out long forms is challenging, particularly when repetitive or unclear, and be aware that nuances between things like street, address, mailing address add to the confusion and cognitive burden. Differences in mental function and sensory processing lead to distraction, overwhelm, and difficulty focusing. Filtering out unnecessary sights and sounds leads to regular feelings of overload and overwhelm. Becoming too overwhelmed leads to a shutdown, whereby completing tasks and articulating needs becomes difficult. Overwhelm was the sentiment most expressed by neurodiverse participants.

## **Theme 3: Emotional State**

### **Negative emotional experiences are leading to disengaged banking customers**

Neurodiversity can be associated with difficulty regulating emotions which can lead to problems with anxiety, depression, and impulsivity. A banking experience that is not designed for the ways in which neurodiverse minds process and learn information, particularly financial information, can lead to feelings of fear, frustration, mistrust, and a sense of overwhelm. Neurodiverse participants commonly described these emotional states and lead to disengagement, not only with the bank, but with the process of managing one's personal finances. Neurotypical participants shared many of the same emotional states.

#### ***ANIXIOUS OR AFRAID***

There was a theme of fear of not understanding banking information, a fear of getting 'scammed' or taken advantage, a fear of fraud when statement line items are not easily recognized, and a fear of forgetting to pay bills. Interviewees expressed the sentiment that finance is intimidating.

The following quotes were stated by both neurodivergent and neurotypical participants expressing the fear and anxiety that surrounds their money management experiences:

*"I feel very anxious. I am worried I will make mistakes, or the bank will make mistakes"* neurodivergent participant

*"I'm sometimes too anxious to check my accounts"* neurodivergent participant

*"I feel very scared about my money"* neurotypical participant

#### ***UNTRUSTING***

There was also a sentiment of lack of trust towards the apps and a lack of faith that the in-person experience will go well. This sentiment is reflected in the following quotes by neurodivergent individuals:

*"I feel uncomfortable using Bank apps on my phone due to hacking and security reasons"* neurodivergent participant.

*“I go with pen and paper due to my trust issues. I don’t need my information tracked by someone I don’t trust” neurodivergent participant*

### **OVERWHELMED**

Feeling overwhelmed by the quantity of information and the inconsistency of terms and acronyms is very common for people who identify as neurodivergent and those who do not. Both groups described feeling overwhelmed by the volume of information, the number of accounts, the burden of tracking transactions, and getting “lost in the numbers.” The feeling of overwhelm causes people to shut down and simply avoid or put off completing budgeting or banking tasks. Both neurodivergent and neurotypical participants expressed feeling overwhelmed as reflected in the quotes below:

*“It causes me to feel overwhelmed and therefore I avoid, which I know is not the best approach, but alas, ADHD wins!” neurodivergent participant*

*“I feel completely overwhelmed. I don’t know where to begin, so I pretty well ignore it altogether” neurotypical participant*

*“Going into the bank is overwhelming. Lots of sounds, multiple conversations, brightness of lights, visual distractions...it’s hard to filter things out” neurodivergent participant*

### **ORGANIZED**

Those who do track expenditures and finances described feeling organized and better able to see what they are spending. While those in the control group described visual organization as helping them budget better, neurodivergent participants felt that while they can better see what they spend, it does not help curtail their spending.

## ***DISENGAGED***

Neurodivergent individuals expressed a lack of engagement and minimal contact with their banks. They rarely go into a branch and don't know their contact person. Some described using minimal products beyond debit and credit. There was a sentiment of disengagement and an expression of 'feeling like a number.' They described a lack of human experience and connection with the banks in the following quotes:

*"The only thing I get are my bills. I have no contact with the bank at all". Neurodivergent participant*

*"Not really engaged. I feel like a number in their file". non-neurodivergent participant*

## **Theme 4: Expectations**

### **Expectations About Banking Experiences are Rapidly Evolving**

Customer demands, and expectations have continued to evolve across industries and banking is no exception. Banks rely on a strong reputation and a superior customer experience to remain competitive. As customer expectations evolve, delivering on them creates challenges for banks. While digital transformations are typically the focus in the financial sector, with progress being made, there remains a large gap between what customers want and what banks are delivering (Puga, 2023).

#### **Personalization**

Providing mobile-first and omnichannel experiences has become table stakes. Customers now expect data-driven personalized customer journeys. Interviewees mentioned customization and personalization frequently; they want the ability to customize in a way that works for them. Given neurodiverse people have different cognitive approaches, and given the variability amongst different forms of neurodiversity, it stands to reason that people would seek the option to customize. They want to feel like their banking tools were designed for them.

#### **Choice**

Participants wanted to be able to make choices while on the banking website or app. Choose colour codes in a way that works for them, or “choose my own adventure” when they login to their banking app, where they could select the reason for logging in and be taken to a screen designed solely for that purpose. The desire for choice helped them to feel empowered.

The findings below have been aggregated from the interviews with financial sector participants using affinity mapping to uncover themes and extract insights. These findings are intended to better understand the level of awareness and action being taken by banks to empower neurodiverse customers. Confidentiality was ensured to enable open discussion while protecting sensitive issues.

## **Awareness**

Bank employees described having limited awareness of neurodiversity within their banks. While they were broadly aware of the terms Autism, Dyslexia, and ADHD, they didn't feel they had a good understanding of the different conditions and had no understanding of the banking experiences of neurodivergent individuals. There was awareness and a desire to advocate for co-workers who are neurodiverse. Bank employees respected the pride associated with neurodiversity and expressed recognizing contention within HR departments struggling between maintaining employee privacy and celebrating diversity. The result being neurodiversity is not talked about. Bank employees spoke to the novelty of neurodivergence as a topic of discussion and awareness in the bank as quoted below:

*"I think this is still new information for a lot of people" - bank employee*

*"It is not being spoken about" - bank employee*

## **Theme 5: The Desire to Accommodate Exists, the Progress is Slow**

Bank employees expressed genuine interest and passion towards being more accommodating. They recognized the need to conduct design research to understand and design for the needs of neurodiverse customers and fellow employees, however, identified time and resources as barriers. The following quotes from bank employees speak to the limited resources contributing to slow progress:

*“We don’t have capacity or resources...we have a long way to go” - bank employee*

*“The bank is aware and does care, but how quickly we can touch the data and update it is slow” - bank employee*

*“The research is just beginning to arise; we need the data and statistics. Nothing moves quickly, as much as we would love that.” - bank employee*

## **Theme 6: Employees Want to Learn About Neurodiversity**

Bank employees spoke about the importance of awareness and their desire to have more training to understand the needs and wants of neurodivergent customers and co-workers. Lack of continuity with training and lack of comprehensive training was expressed as frustrations that impeded their ability to move the needle on inclusion. The following quote speaks to the lack of neurodiversity awareness:

*“We do all sorts of training at the bank. They try to give us some awareness of other people’s experience (Black, Indigenous), but nothing on neurodiversity” - bank employee.*



# Synthesis of Findings

## Empathy mapping

To gain deeper insight into our interviewees, we leveraged a collaborative tool called an empathy map. This tool provided a simple, easy-to-digest visual that allowed us as researchers to capture knowledge about our interviewee's behaviours and attitudes. The empathy map also helped us identify their fears, frustrations, and anxieties (pains) as well as their wants, needs, hopes, and dreams (gains) as they relate to managing their money.

## What Neurodiverse Individuals Want Banks to Know

We asked participants to share what they would like banks to know and understand about neurodiversity and how it impacts their money management experiences. Their responses are aggregated in the form of a hypothetical letter to the bank to convey their sentiments in a memorable and impactful way. It is intended to inspire co-creation.

“Dear Big Bank,

We've known each other for years, yet I feel like you have no idea who I am.

I opened my first account with you many years ago. I was just a teenager then. My parents helped me to get a bank account and encouraged me to track my spending. I never understood what they meant by that. I thought it was cool that I could tap a plastic card to buy things, but I barely looked at my account. That felt like an imposing and exhausting proposition. A sea of numbers and acronyms with endless options to click deeper into the abyss. I did not like looking at any of it! I still don't. I discovered I have attention deficit with hyperactivity disorder (ADHD) when I was in university. This diagnosis helped me understand some things about myself, like why I can focus on certain things for hours at a time, but I put off getting started on things until the last minute. Turns out I'm not lazy, despite what my teachers often thought. Time management is a struggle for me; I have difficulty prioritizing and remembering all the elements I need to do to complete a task, so many tasks do not get done on time.

Sometimes, too much information comes to my brain; it just can't process it and, I become overstimulated.

Walking into your branch can be overwhelming for me; it's often noisy and crowded, and there's much more happening there than you think! There are a lot of sounds and multiple conversations happening; it is hard to filter things out. I like it when there is a

greeter desk before I get to the teller; they help me know where to line up and are quite friendly. I find the lights are bright; there are processes to follow, forms to fill out, PIN numbers to remember, and the visual distraction of ads on TV monitors. I get tired just being there. I feel like you should know this about me, and not just me, many of your customers and employees are neurodivergent like me. There are many forms of neurodiversity, all with their own characteristics and ways of thinking and being in this world. You should learn about all of them. You should teach your staff about neurodiversity, about what it feels like not to be understood, and what it feels like to feel like you're being judged for not interpreting things the same way as you do. Awareness would go a long way....in fact, it would be so nice if there were a way to flag that I'm neurodivergent, so I don't always have to ask for accommodations and things. I feel like a burden when I need to ask for a quiet room to do my banking; I feel more stigmatized. How nice it would be for this to 'just happen' I would also love for you to teach your staff that things might take me longer, I might need you to show or explain things differently and I might forget what you just said, so what I need from you are patience and compassion. I'm not trying to annoy you.

I don't know if you know this, but neurodiversity affects all income and education levels. I have a university degree but let me tell you that managing money remains elusive to me! I have a lot of money coming and going; I have a well-paying job and some funding. You have so many opportunities to help me manage it all, but just a heads up, my ADHD can make me impulsive; I can't always control spending binges or deals that are too good to pass up! My friend who has a brain injury does the same thing. You could help us with this; notice if there are lots of withdrawals and flag that, then check in on us. We could use check-ins! I feel like we could work together to figure out how to make this relationship a better experience for me. We could co-create some great solutions that will help both of us. What do you say? Would you like to get creative with me? I have tons of ideas!"

## Chapter 3: Discussion, Limitations, & Next Steps

### Discussion

This study aimed to bring awareness to the ways neurodiversity impacts financial management and to encourage financial institutions to design financial information for neurodiversity accessibility while taking into consideration unique learning styles. We hope it will encourage financial institutions to design financial information for everyone. Two participant groups were recruited for the research. The primary participants were five neurodivergent adults who use banking services to manage personal finances. The lived experiences and opinions deepened our understanding of what it feels like to use products and services not designed for neurodiversity and how it impacts money management. Data analysis taught us that neurodivergent banking customers aren't happy with their current money management. They don't feel banks present information in a way that makes sense to them, or that makes them feel confident. The experience of going into the branch can be so overwhelming they just don't go. Avoidance behaviour was also seen in 10 neurodivergent participants and ten neurotypical participants who say they look at banking information as little as possible as it's too stressful.

This study showed that feelings around personal finance for neurodivergent individuals are mostly negative. There is a strong sentiment that banking information is not presented in ways that are easily understandable or digestible causing people to avoid looking at it. There are a lot of feelings of fear, anxiety and overwhelm described by both neurodivergent and neurotypical participants. Neurodivergent individuals are not engaged with financial institutions. There are some individuals however that do find the tools easy to use and find the digital experience easier than trying to remember where pieces of paper have gone. The burden of overwhelm and cognitive fatigue must be considered for both the in-person and digital experience. When people feel that tools and services are not designed for them, they get frustrated and disengage, costing banks customers and negatively affecting economic health.

Secondary participants were individuals who work for a big bank and have an interest in accessibility or design. Their subjective input served as a barometer of the banks' level of awareness, advocacy, and design for neurodiversity. The analyzed data indicated that there is a desire within financial institutions to improve design to be more inclusive, and a genuine sense of caring. However, it is accompanied by a feeling of yearning and resignation. The bank employees yearned to research and design for all customers. Still, they were somewhat resigned to the slow ability to create change in large financial institutions and the lack of enabling resources.

### **Imperative to Accommodate for Neurodiversity**

Canadian banks are currently falling short when it comes to meeting neurodivergent and neurotypical customers' expectations around product variety and accessibility. Several reasons have contributed to this; there is a lack of data to inform the needs of current and future clients, there is a lack of involvement from neurodivergent customers when it comes to improving financial accessibility, and, lastly, there is a lack of commitment from governments. By addressing these needs, Canadian banks can reimagine their products, models, and corporate culture to deliver the next-generation banking experience (Bertelsen, Murphy & Benhamron, 2021) In a world in which customer expectations of having their needs met instantly are constantly rising, the banking experiences provided by most banks are falling desperately short. Banks need to acquire both a qualitative and quantitative understanding of neurodivergent and neurotypical individuals. The data we present here begins to show that there is a lot of work to be done by financial institutions to ensure that they are designing tools and creating experiences that aid neurodivergent individuals with money management and overall financial health. It is hoped that the qualitative data and human insights gathered by the researchers will serve as a starting point for banks to test, learn and come up with human-centred solutions.

To compete in a digital world when global events have accelerated the shift in customer expectations and habits, banks must focus on personal and emotional connections with customers to strengthen their trust and grow. Banking customers are re-examining their relationship with money, financial resilience and relationships with institutions after a year in which global events massively accelerated change and shifted customer expectations and habits and this will lead to more competition within the banking industry (Bertelsen, Murphy, Benhamron, 2021).

New entrants to retail banking have pounced on opportunities to create innovative digital propositions and change the tone and nature of customer interactions. Emphasizing a collaborative and empathetic “we’re in this together” brand positioning has resonated with many customers—20 million accounts were opened with challenger banks operating in the UK in 2019.

Not only does design for neurodiversity presents a big opportunity for banks to expand and satisfy their customer base, but it is also the right thing to do, and it has increasingly become a customer expectation. An expectation that will cause them to switch to a financial institution that does design for their needs. This poses a threat to traditional banks as we see start-up financial technology companies such as Wealthsimple with a mission to “help everyone achieve financial freedom no matter who you are or how much you have” *What is Wealthsimple and how does it actually work?* (2021) Wealthsimple is winning awards for UI design, UX design, and innovation. The simplicity of the investing experience and the pleasing visual design makes it an appealing alternative for neurodivergent investors. Traditional banks will continue to face increasing competition as the imperative to design for neurodiversity and universal design continues to grow. The statements below were taken from Wealthsimple magazine; they speak to their aim of simplicity and humanity (despite being a technology company!).

***Paperwork is for big banks. We believe that a product isn’t really simple unless it’s dead simple to get started on. That’s why you can sign up from your phone or laptop***

*from anywhere. You just answer a few questions, skip the paperwork, and you're ready to go in a few minutes What is Wealthsimple and how does it actually work? (2021).*

**Technology + Humans.** *As we're human beings ourselves, we value people. They give great advice and sometimes they're nice to talk to. So, we have a team of experts at Wealthsimple who can walk Invest clients through any questions they may have. And for those who never want to talk to a human, we hear you: that's an option, too. What is Wealthsimple and how does it actually work? (2021).*

## **Focus on Humanizing Banking**

To create engaging, desirable, and useful products and services for neurodivergent customers, financial institutions must co-create using human-centred design. Human-centred design will enable banks to understand the needs of customers as they gain better data to do so. To create a more human experience, financial institutions should focus on meeting the human needs we identified through this research. These human needs include belonging, compassion, respect, joy, equality, knowledge, clarity, safety, connection, and comfort. To improve engagement, banks must go beyond products to services, labour, the built environment, and education. No customer wants to feel like a number in a transaction- focused service model. All customers want to feel valued as human beings first and foremost. Neurodivergent customers feel less human every time they experience stigma, uncertainty, or unnecessary confusion. It is the responsibility of financial companies backed by government policies to make banking a more human experience for all.

## **Designing for Neurodiversity Provides Value for Everyone**

Designing for accessibility means designing to meet the varied requirements of diverse users who might engage with your product. Similarly, inclusive design prioritizes understanding user diversity. It is more human centred with diverse perspectives. As per Microsoft's definition, "Accessibility: the qualities that make an experience open to all." While "Inclusive design: is a methodology that enables and draws on the full range of human diversity *Best Practices for Accessibility and Inclusive Design in Financial*

*Services*. (2022). Accessibility and inclusive design should be a priority for every UX and UI designer. Accessible designs enable people with visual, motor, auditory, speech, or cognitive impairments to get the best user experience from your product or app. To create an inclusive design, UX and UI professionals think through the complete range of human diversity relating to ability, language, culture, gender, age, and other forms of human difference *Best Practices for Accessibility and Inclusive Design in Financial Services* (2022). In doing so, they have the potential to benefit diverse groups of people. Creating solutions with neurodiversity and other disability scenarios in mind will help increase awareness, empathy, and inclusivity.

## **The Value Proposition**

A value proposition canvas is a visual tool that helps you position your business's product or service around your customers' needs. This framework helps ensure that a product or service is positioned around what the customer values and needs *Value propositions- business model canvas, (n.d)*. We used the value proposition canvas to identify the *pains* or difficulties neurodivergent customers have when trying to get money management tasks done and *pain relievers* that can reduce or eliminate the things that are annoying to customers. We also identified the *gains* customers want and the gaps in meeting customer needs, and the *gain creators* or opportunities for financial institutions to create value for neurodivergent customers. These pains and gain creators have been summarized in the table below. The *pains* and *gain creators* were extracted from the data, and the ideas were offered by participants during the interviews, it is intended that financial institutions would conduct co-creation sessions to ideate further and continue to complete the design cycle. Note that due to the limited sample size, this list is not considered comprehensive but serves as a starting point. The gain creators have been turned into 'how might we' statements to help open the gates of possibility.

Pains	Gain Creators	Human Need	Ideas Generated by Participants
Feel judged & stigmatized	<p>How might we eliminate the feeling of stigma &amp; judgement from the banking experience?</p> <p>How might we create a sense of belonging?</p> <p>How might we bring the invisibility of neurodiversity to light and create awareness amongst bank employees?</p>	<p>Belonging</p> <p>Respect</p> <p>Compassion</p>	<p><b>Learn about me</b></p> <ul style="list-style-type: none"> <li>• Provide employee training re: awareness of and empathy towards the needs of those who are neurodivergent.</li> <li>• Increase level of patience at the tellers</li> <li>• Don't make me always have to always ask for accommodations; I feel like a burden</li> </ul>
Banking is not pleasant	How might we fulfill customers desire to experience joy when managing their money?	Joy	<p><b>Take me on an uplifting journey</b></p> <ul style="list-style-type: none"> <li>• People don't want to feel depressed when they open their bank accounts, they want to feel uplifted!</li> <li>• Apps should start by welcoming me</li> <li>• I want to be guided through a colourful, visual experience that provides insights in very clear and intuitive ways</li> <li>• I don't want to be greeted by the bottom line</li> </ul>
Feel confused by banking products & processes	How might we reduce cognitive effort and ensure visual information is friendly and easy to understand?	Equality	<p><b>Show me in ways I can understand</b></p> <ul style="list-style-type: none"> <li>• Use short &amp; clear communication</li> <li>• Provide summaries</li> <li>• Use more charts, pictures, graphs, and visuals</li> <li>• Use colour coding</li> <li>• Minimize use of long text</li> <li>• Eliminate paper</li> <li>• Use store logos so I can easily identify transactions</li> <li>• Minimize visual distractions</li> </ul>
Inadequate knowledge of financial information	How might we create learning experiences to ensure people can learn about money in a way that is easily understood for their learning style?	Knowledge	<p><b>Make it easy to understand</b></p> <ul style="list-style-type: none"> <li>• Offer coaching / explaining</li> <li>• Offer insights</li> <li>• Provide alternate ways of learning (visual, auditory, read/write, kinesthetic)</li> </ul>
Lack of engagement	How might we engage neurodivergent customers, so they feel a sense of		<p><b>Make it personalized</b></p> <ul style="list-style-type: none"> <li>• Check in on me</li> </ul>



with financial institution	connection with their financial institutions?	Connection	<ul style="list-style-type: none"> <li>• Provide personalized recommendations</li> <li>• Send me notifications</li> <li>• People want to have a sense of control and empowerment when using banking tools, they want to choose what to look at when they open an app, they want a variety of exciting choices of where money deposits go.</li> </ul>
Feelings of fear and lack of trust	How might we design financial products and services that create psychological safety and trust?	Safety	<p><b>Build my trust</b></p> <ul style="list-style-type: none"> <li>• Minimize my need to use third party apps / it's scary giving them my info</li> <li>• Show me how my money and my information is safe</li> </ul>
Difficulty engaging with products (UX not designed for neurodiversity)	How might we design financial products and services to accommodate preferences for visual information?	Clarity	<p><b>Design it for me</b></p> <ul style="list-style-type: none"> <li>• It would be lovely If I logged into my banking app and had the option to "choose my own adventure". So, I'd be asked to select my reason for logging in and taken to the screen necessary to complete that</li> </ul>
Unpleasant or exhausting experiences at bank branches	How might we design our bank branches to be inclusive and respectful of neurodiversity?	Comfort	<p><b>Design for comfort</b></p> <ul style="list-style-type: none"> <li>• Provide employee training re: awareness of neurodiversity, how to be patient, how to minimize feelings of stigma.</li> <li>• Provide a mechanism that flags self-identified neurodivergent customers in the system and quietly offer accommodations they may find helpful such as a quiet room or more time to complete banking</li> <li>• Minimize visual &amp; noise distractions</li> <li>• Provide a quiet space for me to do my banking</li> </ul>

**TABLE 8. THE VALUE PROPOSITION CANVAS**

## **Limitations**

### **Research Samples**

This research lacks statistical power because a large enough survey sample size was not achieved, and we interviewed a relatively small sample of 8 people. This included 3 bank employees (2 females and 1 male) and 5 Neurodivergent individuals (3 females and 2 males). All bank employees were referrals from one of university professor. For a truly representative cross section of bank employees, an expanded recruitment campaign that targeted more diversity of voices would have been helpful and no doubt enriched the insights of this work. Though we were pleased to almost achieve a balanced gender ratio between our two groups, this work would have been enriched by the perspectives brought from a more diverse cross section of people who could speak to their experiences, particularly from a BIPOC point of view.

### **Methodology**

This research was designed using a human-centred design (HCD) approach. Due to time constraints, we were unable to complete the design cycle. While we were able to generate ideas and identify some design opportunities; we were unable to test out potential solutions. Co-creation workshops would have broadened and enriched the ideas and recommendations provided to financial institutions. Based on our research methods, we made our best attempts to understand our participants on a more human level, synthesize our ideas to provide insights and some interventions. Future researchers should take care to prioritize each step as it would undoubtedly yield even better results.

## Next Steps

As researchers, we are proud to have begun this project that focuses on how financial institutions might design financial information for neurodiversity accessibility and unique learning style accommodation. We live in a world of convenience that's becoming increasingly more digital. It is only right that we continue to design the world we live in to be one for everyone, especially those who have been disenfranchised so frequently before. Accessible banking is fundamental to financial inclusion, which in turn supports confidence, dignity, independence, and financial wellbeing for everyone *Students use technology to make banking more inclusive*, (2021). Therefore, as a next step, we ask future researchers and banks to pick up the mantle while taking a Human-Centered Design approach and complete the design cycle we have begun. This will enable you to co-create products and services that resonate and are tailored to your audience's learning and money management needs. It is important that banks keep humans at the centre of their development process as this will ensure continuous innovation and universal product-market fit.

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