

# SRO: Student Showcase

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## About the SRO: Student Showcase

The *SRO: Student Showcase* presents research papers and literature reviews as well as graphic representations, data analysis, abstracts and other essays. This issue of the *SRO* collects some of the most promising papers submitted to our platform.

It is hoped that by presenting this issue the student scholarship on display will reach a wider specialist and non-specialist audience and generate feedback and a scholarly profile for the authors. See our website for more details about the platform.

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# Single-Parent Families and Adolescent Well-being

By Yayue Deng

## AUTHOR BIO

Yayue Deng, a girl who grew up in a single-parent family, is a high school student in South China who will graduate from high school in 2024 and go abroad as an undergraduate. She has various interests in her daily life, such as dancing, playing the piano, chess, badminton, and sketching. In academic learning, she loves psychology in general. Specifically, social psychology and development psychology. The reason for writing this paper is that since she has grown up in a single-parent family, she has faced lots of surprise from others about how mentally and physically healthy she is when they learn that she is from a single-parent family. She argues that family structure is not an obstacle in adolescent growth, and that the things that determine adolescent well being are enough love, support, and attention from parents.

## ABSTRACT

With the current high divorce rate in lots of countries, including China and the United States, the number of single-parent families is rapidly increasing, so single-parent families are no longer uncommon. However, most people still perceive that the single-parent family structure is harmful to children's development and adolescent well-being as all socioeconomic support and family responsibilities are shouldered by one parent. Nevertheless, this paper explains that children who grow up in single-parent families can receive and achieve nourishment and well-being equivalent to children in two-parent families by pointing to two factors to alleviate this common concern, one related to the distribution of the divorce rate and household income, and the other related to community support. Also, this paper illustrates the points that truly matter to adolescent wellbeing, including contact, comfort and emotional attachment, attachment behaviors and bonds, and parenting style and scaffolding behaviors, which can be achieved regardless of the family structure and that are more about love, support, attention, and strong attachment bonds.

**Keywords:** *Single-parent families, socioeconomic support, emotional support, contact comfort, community support, parental income, adolescent well-being, parenting style, attachment theory, attachment bond.*

## INTRODUCTION

From 1900 to 2018, the divorce rate increased from 4.1% to 15.7% in the United States (Schweizer 2020), and 0.018 % to 0.336% from 1978 to 2019 in China (CEIC, 202). Under the sky-high divorce rate, the number of single-parent families has had an upward trend. In the United States, nearly 24 million children live in single-parent families (Casey, 2022), which triggers discussions centered on the impact of single-parent structure on adolescent wellbeing, a secure state in which teenagers are healthy both physically and mentally and can achieve their potential future growth (Ross et al., 2020). People commonly assume that with a lack of one side of the parental unit, children, especially in adolescence, will more likely live in poverty compared to those from married-parent families. As a result, children’s physical and mental wellbeing would be negatively influenced due to limited financial and socioeconomic support (Casey, 2022). In reality, children who grow up in single-parent families receive as much nourishment as children in two-parent families. This paper gives two solutions to this common concern and reiterates the elements, including love, support, and strong attachment, that matter in the development of children.

## LIMITATIONS

This paper does not distinguish between single-mother families and single-father families, and it does not discuss cultural differences between families..

## Common Concerns Regarding Single-Parent Households

The main concern about single-parent families is that there is only one source of income, which may limit the developing person’s access to basic needs and their opportunities for extracurricular enrichment. Furthermore, single-mother families are the

main victims of low socioeconomic support, due to the gender stereotypes in employment and education. This criticism leads to the conclusion that single-parent families are detrimental to children’s development because they are devoid of food, health care, shelter, utilities, and transportation (Casey, 2022). However, the impact of relatively lower income in single-parent families than married-parent families can be eased by a difference of distribution in marital dissolution and support of community.

## Parental Income

In understanding the distribution of divorce and parental income, low socioeconomic support can be alleviated. Urbanites have a higher marital dissolution rate than those in rural areas, due to variations in social controls and interactions (Shelton, 2016). At the same time, urban cities’ household income is higher than rural areas, which means single-parent families in urban areas may still have enough financial power to raise their children comfortably. Similarly, in China, the educational gradient of divorce remains positive; the number of children who can be educated still rises, even though the divorce rate has increased. Research shows that the household income of single-parent versus two-parent families is not different (see Fig. 1). Thus, divorced parents, particularly single mothers, are not necessarily more disadvantaged than married parents in urban areas (Zhang, 2019).

**Demographic and Social Characteristics of Children Under Age 18 in Each Type of Family, a Pooled CFPS Sample**

	Urban (%)	Parental education percentile score	Household income per capita (10,000 Yuan)	Value of household assets (10,000 Yuan)	Coresidence of grandparent(s) (%)
Intact two-parent families	42.7	42.5	1.2	42.8	36.9
Divorced single-mother families	77.4**	61.7**	1.7	41.0	45.3
Divorced single-father families	47.2	44.2	1.3	41.2	71.0**
Stepparent families	47.3	44.1	1.1	41.9	39.0

Fig. 1. Data distribution in different family structures (Zhang, 2019).

### **Community Support**

Extended families, including grandparents and other relatives, and the other parent who left the family (provided they are still present) can play an important role in compensating the financial loss to which many single-parents are subject. China's mainland shares this phenomenon with other Asian societies, such as Japan, Hong Kong, and Taiwan, in which a strong family bond provides kinship (Zhang, 2019). It is common for three generations to live together in Asian families, and grandparents or relatives would help their sons and daughters to take care of their children when they go out to work. Furthermore, some parents who are too busy to take care of themselves even send their children to live with their grandparents, so some of the daily expenditure for raising children will be paid by extended family members, which reduces the financial burden of the single-parent. Also, when two people divorce, the person who doesn't get the guardianship of children will be required to make financial contributions to the primary parent and children, which also helps single-parent families to recover their financial losses. In this way, when parents divorce, an extended kinship network can distribute the responsibility of raising children, and the monthly income from the other parent can greatly offset the negative financial effects brought about by the separation of two parents.

### **Family Structure and Adolescent Wellbeing**

The well-being of children is not all based on the financial resources; love and affection matter, too. Children who grow up in a rich family that meets all their material desires will still be negatively impacted without the establishment of attachment bonds, cognitive formation, social interaction, and academic learning, which is likely if their parents are too busy producing income to emotionally attend to their children (Hetherington, 2022).

### **Contact Comfort & Emotional Attachment**

In the 1950s, behavioral psychologist Harry Harlow conducted research to prove that maternal contact, or *contact comfort*, is much more important than the provision of basic needs. He replaced the real mother of an infant monkey with two fake "mothers": one, a feeding robot made of wire, the other one, a robot wrapped in soft cloth. He analyzed the infant monkey's distress responses by making a threatening machine to frighten the monkey. Although the infant's food and biological needs were provided by the wire mother, the monkey stayed with the surrogate mother, a robot wrapped in soft cloth, to get comfort. This study emphasizes the importance of accompaniment and comfort when raising children because, at the time of the study, much of the public believed that the provision of food, clothes, and shelter were the key elements for the growth of children (Cherry, 2018). When subjected to contact comfort, a child's initial love response is built up, so little animals and children can feel the affection from their parents, step-by step, which forms a strong emotional attachment. As shown in Fig. 2, during physical contact, the sensorimotor reflexes are triggered, which calm children and boost a sense of safety (Yoshida & Funato, 2021).

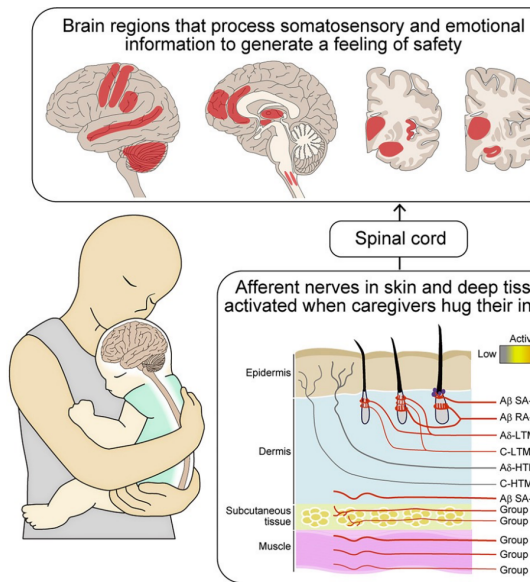


Fig. 2. The impact of physical contact on children (Yoshida & Funato 2021).

Therefore, even in a single-parent family, each parent may still be able to give enough love and attention to their children, and love and attention have no relationship with wealth disparity.

### Attachment Behaviors and Bonds

The formation of attachment bonds during a child's growth plays a significant role in any family. *Attachment behaviors*, coined by John Bowlby, help children build up survival skills by interacting with their parents in a secure environment, including crying, smiling, crawling, and reaching. During this process, children's "internal working models" are developed, which become more sophisticated as their cognition matures; they form the ability to memorize, focus, and speak. If caregivers can give a child enough love and attention to help them grow up, their cognitive ability and attachment bond will get stronger to pave the way for future development. According to Vygotsky's theory, interactions with adults, especially parents, are the foundation for children to develop higher psychological functions. In addition, the attachment quality influences the formation of self-esteem (Cassidy,

1990). Children who grow up in an insecure environment are more likely to have low self-esteem, which will be vulnerable to test anxiety, so, in turn, would negatively impact future achievement (Ruiter & Ijzendoorn, 1993). As a result, the attachment establishment is so important that it is directly related to children's psychological functions and future achievement, which does not consider the family structure, but only parents' love and responsibility.

### Parenting Style and Scaffolding Behaviors.

Parenting style affects children's later academic performance, such as problem-solving, responsibility, and thinking patterns. By giving small cues while assisting and accompanying children to practice a new skill, parents help children form the concepts of cooperation and competence (Ruiter & Ijzendoorn, 1993). In this way, parents' *scaffolding behaviors*, assisting behaviors that help children attain what they can't manage alone, vary between parenting styles. There are four types of parenting styles: authoritarian, authoritative, permissive, and neglectful. The most effective style is authoritative because children with an authoritative parent cannot only realize their errors, but also learn solutions for similar situations. Infants who grow up in a secure environment with effective scaffolding behavior directing are more likely to get higher scores on future tests (Ruiter & Ijzendoorn, 1993). Parenting style depends solely on the individual parent, rather than the type of family structure. Furthermore, the single-family structure takes advantage of parenting-teaching style selection because it doesn't require mediation between opposing parenting styles.

### Conclusion

This paper explains how the single-parent family structure can be as effective in raising children as a two-parent family structure, by showing two efficient solutions for



a common concern regarding single-parent families. This paper addresses the elements that truly matter in adolescent well-being: contact comfort and emotional attachment, attachment behaviors and bonds, and parenting style and scaffolding behaviors.

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# Sports and Venture Capital Firms

By Annie R. Han

## AUTHOR BIO

Annie R. Han is a high school student interested in entrepreneurship and sports. She has participated in many economic and business competitions and studied angel investments and venture capital. Annie has more than eight years of professional swimming experience and has won many swimming competition awards. Annie also has interests in ice skating, badminton, tennis, dancing, and other sports. Therefore, she has tried to explore the relationship between business entrepreneurship and sports, aiming to integrate her two interests in this paper. She analyzed the potential link between venture capital firms and sports startups, as well as the long-term development and prospects of these firms.

## ABSTRACT

Venture Capital (VC) firms in sports have varied targets, timings, and budgets according to their firm types and they usually establish management teams to execute due diligence. This paper mainly focuses on the interaction between VC Firms and sports-related companies by introducing the background and differences among various VC firms in sports. A detailed analysis of a sports tech investing VC firm will be displayed and the execution of due diligence will be explained. Moreover, this paper will also illustrate the development of VC firms in the sports tech sector over time and evaluate their prospects.

**Keywords:** *Venture Capital, Sports, Sports Tech, Due diligence*



## INTRODUCTION

Over 300 million innovative companies and 600 million entrepreneurs exist worldwide, boosting the world's intelligence, technological development, and the economy. Thousands of sole proprietorships, corporations, limited liability companies, partnerships, joint ventures, nonprofit companies, cooperatives, and other types of businesses are continuously entering the world market every day. Roughly, 305 million startups are established each year, many in the United States, which constitutes a home country for more than 70,000 startup companies ranging from tech and gaming to blockchain and artificial intelligence (Wise, 2023). Sports, one of the most well-known fields, attracts hundreds of innovative companies to enter the market. Venture Capital (VC) firms and angel investors play decisive roles in the prosperity of entrepreneurial companies in sports.

Venture capitalists are private equity investors who provide capital to companies they deem to have potential. VC firms are usually formed as limited partnerships and step in when their targeting companies start to commercialize their ideas. They provide funds and marketing advice to the companies, aiming to cash out substantial returns. Despite the earning potential, the risk of VC firms is evident -- an inaccurate evaluation of the targeting company leads to failure. Thus, VC firms evaluate each company carefully, aiming for a strong management team, a large potential market, and a unique product with a competitive advantage, but the overall failure rate is inevitably high. Even so, the riskiness of VC firms does not induce people to give up -- new VC companies are established yearly in the global market, and those in sports account for a large proportion. Notice that VC firms in sports are not limited to sports, but include multiple industries such as media & entertainment, networking & equipment,

information technology services, or consumer products & services. These industries take up 21.5% of the share of VC investment in the United States, just lower than Software, the industry that takes up the largest portion of the VC investment share in the United States (Hallet, 2017). VC firms have jumped into the sports world and we can expect more opportunities for jobs, entrepreneurs, and economic futures to come through this combination.

### Differences between VC Firms in Sports

Taking an overview of the VC firms in sports in the world, each of them has its unique investment style, goals, timing, or budget limit. Even with the same goal, such as within the sports tech sector, each VC firm has different decision-making methods and focuses.

### Differences in Target

VC firms in sports are not limited to investing in one type of company. Entertainment agencies, media companies, sports clubs, sports consulting businesses, sports magazines, sports bloggers, online sports shops, and sports-tech companies are all businesses in the sports industry that VC firms can target.

On one hand, sports technology companies are popular targets of VC firms in sports. ADvantage VC, for example, is an early-stage VC firm located in Jerusalem, Israel that invests in fan engagement and athlete connection (TRUiC team). The firm believes technological developments can foster fan engagement, shape better fan experience, and track the performances of athletes. SeventySix Capital, located in Conshohocken, Pennsylvania, focuses mainly on game-changing startups, esports, and sports technology (TRUiC team). Compared to ADvantage VC, which focuses on the interaction

between technology and fan engagement, innovation in gaming and esports technologies is the main target of SeventySix Capital. Their differences prove that although many VC firms focus on sports technology, they can still target different fields.

On the other hand, VC firms also invest in companies in fields other than technology. For instance, RSE Ventures' major success is the ideation and building of the International Champions Cup, an annual football exhibition competition with over 140 million viewers worldwide (TRUiC team). Liberty City Ventures, located in New York, NY, acts as an incubator and accelerator to fund e-commerce companies in sports (TRUiC team). Yao Capital, a private equity firm named after the famous basketball player Yao Ming, invests in the world's leading kickboxing league and an American sports nutrition company (TRUiC team). The diversified types of companies funded by VC firms demonstrate venture capitalists' difference in interests.

### **Differences in Timing**

Secondly, VC firms have different investing stages. These stages include the pre-seed, seed, series A, series B, expansion, and mezzanine. In the pre-seed stage or the bootstrapping stage, companies build up their products' prototypes. The uncertainty and ambiguity of the products result in high risks that VC firms want to avoid, which reduces the likelihood for them to provide funds at this stage. During the seed stage, companies have pitch decks that illustrate their product potential and future opportunities to attract venture capitalists. Angel investors, individuals who invest their own money in startups, and early VC firms are more likely to participate in this stage. SeventySix Capital is an example of an early-stage VC firm in sports that looks for smartness and passion in entrepreneurs (TRUiC team). During the series A and series B

stages, companies complete their business plan and enter the manufacturing process. Late-stage VC firms provide funds for those companies to finalize their market research and production. RSE Ventures and D1 Capital Partners are two typical late-stage VC firms in sports, aiming to invest resources to achieve better marketing campaigns, strategies, and execution (TRUiC team). During the series C stage, companies are producing exponential growth and constant profitability, which attracts VC firms by the reduced risk of failure. Private equity firms such as Bruin Capital in sports are eager to invest in this stage (TRUiC team). During the mezzanine stage, VC firms usually sell their shares to earn returns since the companies achieve viable businesses. The majority of VC firms in sports diverge into either early-stage or late-stage VC firms, funding their chosen companies at different time periods.

### **Differences in Budget**

Thirdly, the investment each VC firm in sports provides is different. During the seed stage, angel investors and early-stage VC firms are the most active investors. The main difference between them is their budget limitation. Usually, VC firms have considerably more to invest, at an average of \$9.9 million, but angel investors only put in between \$100,000 to \$1 million (Uncapped Technologies Inc.). However, at the seed stage, VC firms usually fund the same amount of capital as most angel investors to lower their risks because the functions and potential markets of their targeting products have not fully developed in this stage. According to Statista, "the median size of venture capital deals in 2020 was \$1.2 million in seed stage businesses", similar to the capital invested by angel investors (Uncapped Technologies Inc.).

Moving to the early stage, firms usually invest around \$4.5 million (Uncapped

Technologies Inc.). For example, Mindspring Capital, an early-stage VC firm in sports, has an investment range between \$1 million to \$5 million (TRUiC team).

After entering the late stage, the investment of VC firms increases, reaching a minimum amount of \$9.9 million (TRUiC team). As one of the top VC firms in sports in 2023 and an enormous late-stage VC firm, ION Crossover Partners has an investment range between \$50 million to \$100 million (TRUiC team).

While some VC firms focus on one stage, others may engage in all stages. Raptor Group is a VC firm in the United States that provides private and public funds to sports companies in the seed, early, series A, and late stages. The fund they provide weighs \$35 million (2022, Nicolás Cerdeira). For firms like Raptor Group that raise funds in all stages, the amount of capital they put in is often huge.

### **Case Study: Techstars**

After being familiarized with the differences among various VC firms in sports, a detailed analysis of a typical sports tech investing VC firm will be illustrated.

#### **Basic Information**

As one of the most famous VC firms that fund startups in sports tech, Techstars is a perfect firm to analyze. Techstars is an early-stage VC firm that provides startups with capital, runs accelerator programs, brings access to one-on-one mentorship, and connects investors with startups. The firm was established in 2006 in Boulder, Colorado, by David Cohen, Brad Feld, David Brown, and Jared Polis (Wikipedia). Until now, it has recruited over 2,900 sports companies to its accelerator program, accomplishing over 6,000 investments, and making a total funding amount of \$109 million (Wikipedia). When the firm was first established, it had a funding range between

\$6,000 and \$18,000 as it was an early-stage VC investor that wanted to avoid risks (Wikipedia). After its maturity, it provides sports tech companies with \$20,000 plus a \$100,000 convertible note as its increasing firm size enables it to afford higher risks and incentives to approach higher revenues (Wikipedia).

#### **Due Diligence**

Usually, VC firms go through the funding process by first pitching the business they want, then conducting some early-stage due diligence on that business, opening a partner sponsor meeting, arranging visits to the investment committee, signing a term sheet, and finally signing the funding contract. Techstars functions like this as well. Although the process seems simple, it is often hard for most startups to even pass the due diligence test, which is an investigation that a businessman should take to evaluate his company, pitch, or products before he signs agreement sheets with others. To pass this test, companies must meet all requirements from their funding VC firms.

Techstars has Managing Directors to judge the viability of startups that apply for its accelerator program. Their due diligence test requires sports startups to have a legal entity that Techstars can invest in, loads of documents that illustrate founders' shares and option pool allocation, and tables that shows the company's current product development and capitalization (Legal Nodes Team). Most importantly, Techstars requires startups to transfer all of their intellectual property to the new company (Legal Nodes Team). These restrictions discouraged hundreds of startups in sports with either low-potential products or products that already exist in the sports market. Fortunately, after the due diligence process, sports companies who pass get a high chance to be enrolled in the Techstars accelerator program, meaning their appliances are being approved. When they sign

the finalized contracts, Techstars will not only provide considerable capital but also help them to ameliorate their products, analyze the current sports market situation, and design suitable market plans.

### **Overall Evaluation**

Although Techstars seems like a well-known VC firm that funds substantial amounts of startups, its success is being doubted. Compared to YCombinator, a VC firm that competes with Techstars in the same market sector, Techstars lacks large exits as proof of its success. There is no data to support Techstars' claim that its investments pay back great returns. Some statistics even show that Techstars' accelerator program failed to accelerate the startups by labeling numbers. According to their calculation, "Over 10% of Techstars companies fail, 11.66% have been acquired or had an exit, and 77.62% are still active and their fate is not yet known" (Stephanie). The failure rate is actually still within the normal range for most VC firms, but it is certainly dangerous for a huge VC company that is growing rapidly. It creates certain threats and potential dangers to Techstars' future development.

Nevertheless, in any case, Techstars is still one of the most outstanding VC companies in the sports tech market for now. One cannot say that it was unsuccessful, only that there were some flaws on its way to success. Regarding the current prosperous status of the sports tech market, solving the low return rate issue will not be hard for Techstars.

### **Development of VC Firms in Sports Tech**

While Techstars is overcoming its internal issues to become more successful, other VC firms in the sports tech sector are achieving maturity over time as well.

### **Development of VC Firms**

Sports tech is a long-developed sector in human history that has received much attention. With the rapid development of technology and the continuous improvement of human intelligence, more and more sports-related innovations have developed, allowing athletes to train and interact with fans in new ways. In 1964, a new electronic automated timing system with improved accuracy was launched by Seiko; in the 1980s, an updated RFID timing was designed (Hire Intelligence). Professional clothing, such as flat tracker shoes, athletic clothes that measure heart rate, and clothes to wick sweat were created over time as well (Hire Intelligence). The development of sports tech is rapid and progressive, not only in the previous fields but also in neuroscience, goal-line technology, video technology, photo technology, and fan-engaging technology (Hire Intelligence).

Along with the long innovative history of sports tech, VC firms behind them are also rapidly developing and have played a vital role. During 2010, opportunities in sports have not been fully explored by VC firms, and the amount of venture investment in sports tech was only about 37 million (TechCrunch). However, it wasn't long before VC firms in sports had their first heyday. According to a TechCrunch Tableau study, venture funding for sports tech startups is growing nearly 30% year over year since 2012, hitting a peak number of \$927 million in sports tech investment in 2014, and investors have spent over \$1 billion in venture deals for sports-related startups over the year of 2015 (TechCrunch). In the past years, the sports tech sector achieved overall funding of \$27.8 billion in 16,800 countries worldwide, with one-third of its fund raised from 2020 to 2022 (Tracxn). In 2022, this sector had over 14,900 startups that engage sportsmen, fans, and other stakeholders in sports industries (Tracxn). The most famous investors that fund these startups include Techstars, Sequoia Capital, Elysian Park, 500

Global, and Y Combinator. Most recently, some experts predict that the total investment in the global sports tech sector “will surpass \$31 billion by 2024, with rising investor interest ensuring that the current influx of capital will only accelerate” (Michael Long, 2020).

Notably, Sportstech X is the best source for data and insights about innovation and startups in sports. It published a Global SportsTech VC Report that gives the most detailed analysis of the venture capitalists' investment in the sports tech sector. Benjamin Penkert, one of the co-founders of SportstechX, and his team conducted this research and analyzed 3000 deals and funding rounds across five continents between January 2014 and September 2019 (Michael Long, 2020). In 2014, North America accounted for the highest percentage of VC funding worldwide, with an amount of \$8.16 billion spent across 1,357 funding funds (Michael Long, 2020). Startlingly, its funded capital nearly comprises double the amount of the funds provided by the ten countries ranked after it in the sports tech sector. New York City, most outstandingly, yields over \$3.6 billion of investment, followed by San Francisco with \$868 million of funds invested, which together accounts for around 40 percent of the total global investment in 2014 (Michael Long, 2020). During the whole 5-years period, the US spends a total of \$12.6 billion in sports tech funding and has a compound annual growth rate of 25 percent (Michael Long, 2020). In the meantime, other regions in the world have increased spending by which the VC firms in China fund a total of \$1949.3 million, \$465.3 million in India, \$457.2 million in the UK, and \$304.3 million in Brazil (Michael Long, 2020). For the first time, the North American share of investment fell below 50 percent, reaching only 35 percent in the global market, down from 86 percent in 2014 (Michael Long, 2020). The increase in the share of other regions in the world and the decrease in the share of North

America demonstrates the phenomenon that the spread of investment has grown more equal than before and the VC firms in the sports tech field are getting more prosperous globally.

### **Development of Former Athletes**

Although the participation of formal VC firms constitutes a large proportion of the total amounts of investment in the global sports tech market, private equity or personal investments held by former professional athletes account for a portion of sports tech investment as well. According to Miles Clements of Accel, "Every professional athlete looks at the tools they have available, and the way that analytics are transforming their preparation for games, and now they are realizing that they have a front-row seat for the changing landscape of sports" (TechCrunch). The fact that the status of former athletes can bring them more convenience in investing in the sports field has led many retired athletes to join the ranks of venture capital. Investing in sports fields brings them more benefits since they understand this field better than other investors, and many of them cannot find other jobs smoothly after retirement. The majority of them who have spare money will choose to use the money to invest in companies they believe have market value or to start their own companies.

Carmelo Anthony is an American professional basketball player who last played for the Los Angeles Lakers of the National Basketball Association. He and Steve Nash, a Canadian professional basketball coach and former player who most recently served as head coach of the Brooklyn Nets of the National Basketball Association, both ran their own venture funds and invested in sports tech companies that they deemed to have potential (TechCrunch). Both of the former athletes acted like VC firms that explore the potential of companies in the sports tech sector.



When VC firms in the sports tech sector thrive, more and more retired athletes will be attracted by this field and participate in the investing process, increasing the number of private equity in the global market. Thus, VC firms in the sports tech field are anticipated to be even more prosperous in the future.

### Prospects

Regarding the surging amount of global investments in the sports tech market and the rapid development of private equities established by former athletes, it is only a matter of time before VC firms in sports tech achieve prosperity. In the future, the success of former VC firms will attract new firms to enter the market, enlarging the sports tech sector through millions of capital funded.

Furthermore, many VC firms are attracted by e-sports, a form of competition using video games and electronic devices, in recent years. The advance of technology promotes its development, making it a convenient sport that everyone can do at home. Hundreds and thousands of VC firms in the sports tech sector discover the potential of e-sports and start to connect with startups in this category. Those VC companies and e-sports are complementary partners. While gaining benefits for themselves, they also achieve prosperity for each other. VC firms provide e-sports companies with enormous initial capital, and the huge profits brought by e-sports companies have also given returns to VC firms.

The cooperation between VC firms and others will bring risks and benefits to them at the same time since they are not entirely sure whether their investment goals are good or bad. But at present, as long as their due diligence process and early judgment are careful enough, the final results are mostly acceptable. Thus, the future of VC firms is very promising.

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# Venture Capitalism in the Mental Healthcare Sector after the COVID-19 Pandemic

By Eddie Wang

## AUTHOR BIO

Eddie Wang is currently a student in Houston, Texas. He was born in China and has studied in the UK during primary school as well as in an international school in Beijing during middle school. He is part of his school's speech and debate team, Model UN team, and has competed in math competitions such as the AMC 10 and as part of the academic team. His personal interests include studying chemistry, world history, and playing the piano. In his spare time he enjoys reading, writing, and challenging his friends to a game of table tennis.

## ABSTRACT

The COVID-19 pandemic was to date the largest-scale disease outbreak of the 21<sup>st</sup> century. It has had far-reaching consequences in all aspects of life. One of the most significant is the global increase in the prevalence of mental health concerns, in turn placing mental healthcare companies front and center for demand. Investors, deprived of many industries which did not escape the financial crisis brought on by the pandemic, may view the emerging mental health sector as an auspicious target. This paper analyzes the impact of COVID-19 on venture capitalism in the mental healthcare sector through comparisons of pre- and post-pandemic states of the financial market and use of case studies of various companies involved in mental health. A generally positive correlation can be seen between the outbreak of the virus and growth in investment. Using these findings, this paper suggests directions for venture capital investment, such as in startups, which balance out potential profit and risk.

**Keywords:** *COVID-19, Mental health, Investment, Venture Capital, Startup Company.*

## INTRODUCTION

When COVID-19 hit in early 2020, the world was caught unprepared. Since its onset, it has caused the death of nearly 7 million people<sup>1</sup> and severe economic recessions. Despite being responsible for the near-collapse of many industries, COVID-19 has inadvertently led to the rise of other markets, most notably mental healthcare. Heavy restrictions and lockdowns implemented to combat the pandemic transformed the lives of billions of people, forcing them to adapt to a post-pandemic lifestyle including remote work and reduction in social activity. Many had to deal with the trauma of losing family members, rising unemployment and extended periods of isolation.

These dramatic changes caused widespread mental distress, increasing global anxiety and depression rates by 25%.<sup>2</sup> In the US, where the virus was particularly prevalent, around 40% of adults reported symptoms of anxiety or depression in 2021, up from just 10% in 2019.<sup>3</sup> Such a dramatic upsurge in psychiatric issues furthered demand for mental health services on a scale unparalleled in history. The impact of the COVID-19 pandemic on mental health created the perfect condition for a greater market for mental health service providers.

### Opportunities for Investment in Mental Health

In 2021, the global mental health market was valued at \$401.31 billion and is expected to reach \$551 billion by 2030, growing at a compound annual rate of 3.5%.<sup>4</sup> The fastest expanding sector was mental health apps with a market size of \$4.2 billion, up by 54.6% from 2019.<sup>5</sup> This growth has been catalyzed by COVID-19, as limitations on travel forced the majority of services to move from in-person to online. As many as 96% of mental health services were digitally provided during the

pandemic.<sup>6</sup> New startups have been quick to capitalize on this trend and use digital resources like apps to ensure broader access to customers.

The startup market for mental healthcare has opened up lucrative opportunities for venture capitalists. Many of the mental health app developers, encouraged by their success so far in the industry, are initiating new rounds of funding to improve their services. The unprecedented growth rate of the mental health app market is a safe bet to yield high return on VC investments.

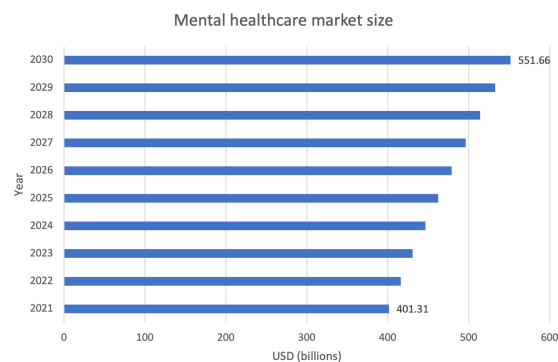


Figure 1. Projected mental healthcare market size between 2021 and 2030 (Source: Emergen Research)

### Case study: Real

The startup Real recently raised \$37 million in series B investment led by Owl Ventures after completing \$10 million in their series A round last year.<sup>7</sup> Real, founded in 2019 by CEO Ariela Safira, provides on-demand group therapies through its online platform. It seeks to expand the accessibility of mental healthcare while simultaneously reducing its cost. Among its key features are “pathways” consisting of multiple sessions and exercises which address specific health issues.<sup>8</sup>

“We’re redesigning mental health care through a digital platform and in-person experiences, integrating empathy, design, and progressive care to build the most elevated

end-to-end product, while also improving the quality of care itself,” Safira outlined as the company’s goal.

Due to its focus on digital services, Real hit the jackpot during the pandemic, which all but halted traditional service providers. Real was thus able to pioneer the new age of mental healthcare, with its services being sophisticated and satisfactory to the public. Its digital foundation also allowed it to adapt almost seamlessly to COVID-19, as seen when it replaced its planned in-person studio in New York with a new therapy website in early 2020 within just 8 days. Real has since become one of the fastest-developing mental health ventures, rising in the market with a total valuation of \$53 million.

In cases like Real, venture capital investment would be more profitable when conducted sooner rather than later. Investing when the startup is at a relatively early stage ensures a lower pre-money valuation before the funding round, allowing a lower valuation cap to be negotiated. This increases the percent ownership of the company acquired through the funding, boosting conversion into equity in the event of liquidation or into stocks if the company undergoes an Initial Public Offering. A higher percent ownership also translates into more influence on the startup’s management, such as having more places in the board of directors. All of these are beneficial to VC investors who aim to extract the maximum revenue from their investment and orient the company in the right direction to achieve this.

This highlights the importance of timeliness in investing. Done too early, and the risk outweighs the return. Done too late, and the return drops considerably. It is crucial to invest when the startup has exited the infamous “valley of death” and is starting to see success with its ventures, but before the company becomes large enough to devalue future funding, as mentioned above. Many new mental health startups

founded around the start of the pandemic have reached the pristine stage for VC investment. Now may be the best time to invest.

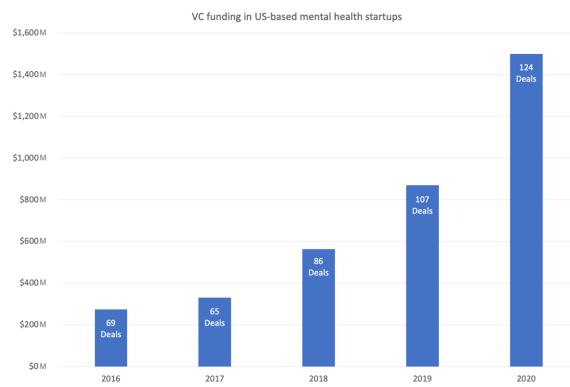


Figure 2. VC deals in mental health startups from 2016 to 2020 (Source: Forbes)<sup>9</sup>

### Case study: Kaiser Permanente

On the other hand, companies like Kaiser Permanente have been less successful in the mental healthcare sector. Though a healthcare giant, Kaiser has been repeatedly accused in the past of denying mental health treatment to its clients, for which it was fined \$4 million in 2013. The COVID-19 pandemic has only worsened the issue. Kaiser’s flawed appointment system and the lack of funding and personnel devoted toward mental healthcare, problems which it has long failed to fix, coupled with the skyrocketing demand for care during the pandemic left them completely overwhelmed. Urgent appointments were delayed for months, leaving patients with utterly unsatisfactory care.<sup>10</sup>

Kaiser Permanente is a prime example of a company that has failed to innovate to adapt to the post-pandemic mode of mental healthcare service. The pandemic provided an invaluable opportunity by multiplying demand for the company’s mental health services, a situation Kaiser as a healthcare giant with ample capacity was perfectly poised to take advantage of. Success was knocking at the door; failure was

completely inexcusable. Instead of expanding and reforming its operations, Kaiser persisted in its old ways, causing the pandemic's benefit to become a detriment.

VC investment in such companies should be conducted with caution for 3 reasons. Firstly, poor performance and customer dissatisfaction indicates a lack of growth potential. Secondly, the large quantity of legal fines should be a red flag, as investment funds may be used to pay those fees instead of helping the company grow, reducing the future returns. Lastly, the fact that Kaiser failed to take advantage of and adapt to the pandemic is a sign that it will miss other profitable opportunities as well.

### **A Grain of Salt**

As with most industries, mental healthcare VC investment comes with a risk. There are signs that the explosive growth in digital mental health is unsustainable – investment in the sector dropped considerably across all quarters of 2022 compared to 2021. Though not ideal, this phenomenon is not as foreboding as it may seem, because 2021 was anomalous in its high funding, and investments this year are still exceeding those in 2020.<sup>11</sup> Still, this raises questions as to whether the innovative solutions offered by startups are long-term and not just a sudden craze which would dissipate after the COVID-19 pandemic, and whether the upward trend in mental health can be maintained.

### **Conclusion**

The state of VC investing in the post-pandemic mental healthcare sector is precarious but undoubtedly worthwhile. Mental health in large part consists of aspects outside of the control of individual investors, such as healthcare law, therapists and insurance. But

these risks are inevitable in investing, and can be mitigated by sufficient due diligence. Investing in mental healthcare is not only a good opportunity to earn money, but also to contribute to the wider society. It has been shown to boost innovation, enhance wellbeing, and improve productivity. Thus, when creating one's investment portfolio, it would be wise to consider mental health as a potential course for investing.

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# A Detailed Review of Factors that Influence Early Brain Development

By Kishan Patel

## AUTHOR BIO

Kishan Patel is a student in Houston, Texas and has lived there all his life. In school, he is part of the Pre-Medical Sciences program and has taken the following classes: Medical Terminology and Public Health. He is also a member of the Medical Mindset and American Red Cross clubs, in which he further enriches his passion for medicine. Outside of school, he attended the University of Texas at Austin Sports Medicine Camp, in which he learned about the anatomy and physiology of the musculoskeletal system and about several techniques used in the field of sports medicine. Most recently, he was accepted into a research practicum program in neuroscience and psychology. He participated in seminars about the role of the brain in memory and prepared a seminar presentation himself. Through this, he authored this research paper about the factors that influence early brain development.

## ABSTRACT

This paper aims to explore the different factors that affect brain development. Early neurodevelopment hinges on several brain processes. Neurons and supporting glial cells have to form inside the neural tube and migrate after doing so. An insulative layer forms around the midsection of the neuron as a part of its maturation and further development. From matured neurons, neural networks are formed which store information that is first learned, then repeatedly retrieved. However, overproduction leads to cell death, which keeps networks functioning efficiently. External influences can be manipulated to help the efficacy of brain development. The factors that influence neurodevelopment on the neurological scale and that are crucial in paving the way for ideal brain maturation will be analyzed.

**Keywords:** *Brain development, Brain maturation, Neurodevelopment, Glial cells, Neurons, Neural networks.*

## INTRODUCTION

Millions of neural connections are created every second during the years of brain development, from birth up until the late stages of adolescence. In these early stages, the brain is vulnerable to a variety of factors that can all impact the instrumental processes that must occur. By ensuring that adequate brain development occurs in the few formative years of life, one can be guaranteed to have a fully functioning brain with ample neural activity during adulthood.

Having ample neurodevelopment is crucial, because although one may not always be cognizant of the processes of the brain, it is constantly having to adapt to the environment. Such adaptations revolve around a singular concept: the neural network. Within this complex, there are billions of nerves; on an even smaller scale, however, there are neurons, the cells or building blocks of nerves.

In order to understand the developmental processes of the brain (Prado and Dewey, 2014) and how certain factors can affect such processes, one needs to know the basic anatomy and function of a neuron. On one end of a neuron is the dendrite, which receives informational signals from neighboring neurons. These signals, known as chemical substances called neurotransmitters, are sent from the axon, which is the middle section of a neuron. When a neuron's resting potential is brought to a high enough voltage by excitatory inputs, an action potential, which is electrical activity, fires across the entire length of the axon, causing the neurotransmitter to be released. After this has occurred, the signal passes through the ends of the nerve ending, called axon terminals, and into the synapse. This is a junction between two neurons where the signal travels and is received by the dendrite of an adjacent neuron, starting

the cycle again.

Returning to the topic of neurodevelopment, the above illustrated functioning of neurons, and, in turn, of nerves and neural networks is what the vital processes of brain development center around. Starting from infancy, they all occur to build and rebuild a complete brain throughout the lifespan. If neurodevelopmental processes were to not happen, entirely formed neural networks would be nonexistent, and information could not be properly retained and retrieved. Because of the intricacy of the brain, as was mentioned before, certain factors play into the efficacy of brain processes, and, therefore, neurodevelopment itself. Prenatal and postnatal nutrition, infections, and social exposure are all factors that heavily influence early brain development.

### **Prenatal and postnatal nutrition**

One factor in neurodevelopment is prenatal and postnatal nutrition. Having adequate nutrition is key to ensure that early brain processes are able to occur with as much success as possible. Five processes and a select amount of nutrients correlating to the efficacy of such processes will be discussed. Proliferation, occurring primarily during the pregnancy period and shortly after, is brain cell division.

The two overarching categories of brain cells are neurons and glial cells, which are a part of neurons and regulate their function. The start of proliferation happens in the neural tube after it is formed from the neural plate, a process called neurulation. Within neurons, axons and dendrites must mature in order to communicate with each other and form neural networks. This process, similar to proliferation, begins in utero, but continues into early infancy. Important components of neural networks are the synapses that allow for neurotransmission.

Formation of synapses in different brain areas takes varying amounts of time, which is the explanation for why certain functions are fully learned at certain ages. Because the number of synapses formed is more than necessary, synaptic pruning occurs, in which many are eliminated based on their usage frequency. This happens in parallel with synapse formation, throughout life until adolescence, to reach the desirable amount (Oppenheim, 1991).

For neurotransmitters to efficiently pass-through axons, an insulative myelin sheath needs to form around it. Myelination occurs from the gestational period and continues until infancy, as certain brain areas and corresponding skills develop. For example, because myelin forms around axons in the parts of the brain responsible for spatial awareness before those oriented with the senses and communication, such skills mature in accordance with how the brain develops. Lastly, brain cells are overproduced similar to how synapses are. Apoptosis, the final of the neurodevelopmental processes going to be discussed, is intentional cell death that occurs to ensure that the ideal number of both neurons and glial cells are present. As synapses are produced between neurons, certain neural paths become obsolete, leading to apoptosis, which refines neural networks down to only what is necessary. The intake of specific nutrients during both the prenatal and postnatal stages can affect the above explained processes (Prado and Dewey, 2014).

### **Deficiency of Energy**

Fetuses with Intrauterine Growth Restriction (IUGR) have been shown to have less brain cells and, therefore, less neuron proliferation (Tolsa et al., 2004). IUGR is caused by a lack of nutrients for the fetus, explaining why a lack of energy nutrients might result in this and disrupt a vital neurodevelopmental process.

Young infants with energy malnutrition have had less dendritic maturation and branching. This can lower the activity and complexity of neural networks, which can harm the early acquisition of skills associated with brain development. In rodents, having a lack of energy during both pregnancy and the early postnatal period causes changes in the amount of synapses present, damaging neural activity (Jones and Dyson, 1981). Myelination has been found to be less prevalent in animals with IUGR and with mothers who have been malnourished. Lastly, a decrease in neurotrophic factors (e.g., BDNF and IGF-1) that are associated with neuron production and development has an inverse effect on apoptosis. A restricted diet, in baboons, caused such factors to deplete and, in turn, increased cell death (Prado and Dewey, 2014).

### **Fatty Acids**

Neurogenesis (neuron production) requires phospholipids, derived from fatty acids, to occur. A deficiency in DHA, a type of fatty acid, for a fetus has been shown to decrease neuron proliferation. In addition, omega-3 fatty acids situated in cell membranes near synapses modulate the formation of synapses and transmission through them. Lastly, because myelin is a substance rich with fatty acids, myelination declines in correlation with a deficiency of fatty acids during the prenatal and postnatal stages of rodents (Prado and Dewey, 2014).

### **Iron**

The enzyme, ribonucleotide reductase (RNR), is responsible for proliferation and DNA synthesis, which is vital for any cell to function. Because RNR requires iron, a deficiency of iron during the gestational and newborn periods of rodents produces a smaller hippocampus. Similarly, dendrites are shortened (Jorgenson et al., 2003), and synapses remain undeveloped

and inefficient (Jorgenson et al., 2005) in the hippocampus, as a result of an iron deficiency, in rodents. Myelination rates do also correlate with iron intake. That is, sub-optimal iron levels decrease myelination. It is important to note that the harm induced on dendrite and synapse maturation and myelination by iron depletion could not be repaired with iron repletion (Prado and Dewey, 2014).

### **Iodine**

Fetuses exposed to insufficient amounts of iodine were shown to have a smaller brain mass, which connects with the fact that neuron proliferation influences the size of the brain. In addition, an iodine deficiency in utero has been shown to reduce dendritic activity and connections to other neurons in several parts of the brain. Similarly, a deficiency of iodine in sheep caused a smaller number of synapses to be present. Regarding the thyroid gland, because iodine intake influences its activity, hypothyroidism, as a result of iodine deficiency, depletes synapse levels and activity. An iodine deficiency, lastly, causes little to no myelination in fetuses, sheep, and rodents (Prado and Dewey, 2014).

### **Zinc**

Zinc is important in DNA synthesis, and, therefore, neuron proliferation. This concept is reflected by the fact that a zinc deficiency of a fetus results in decreased neuron proliferation. Also, in rodents, less dendritic branching was witnessed due to a zinc deficiency. On the contrary, an increased concentration of zinc in the cerebral cortex and hippocampus causes a decrease in synapse formation and function, rather than having a direct correlation on synapse production. This is so because zinc can prevent synapse strengthening (Huang, 1997). Lastly, a deficiency in zinc causes a decline in IGF-1, in turn, altering natural apoptosis (Prado

and Dewey, 2014).

### **Choline**

Choline is a nutrient vital in stem cell production, which can be later differentiated into brain cells. By supplementing choline intake, in rodents, proliferation further increases. On the other hand, a deficiency in choline affects synapse function, namely, neurotransmission. Acetylcholine, a derivation of choline, can power neurotransmission; choline deficiency, therefore, lowers neurotransmission. Apoptosis also unnaturally increases in the hippocampus of rodents due to choline inadequacy (Prado and Dewey, 2014).

### **B-vitamins**

Although folic acid and vitamin B12, two types of b-vitamins, do not have a direct effect on proliferation, they do on the formation of the neural tube. Because cells differentiate within it and a deficiency of such vitamins is known to cause defects of the neural tube, b-vitamins are necessary for adequate proliferation. Vitamin B6 deficiency reduces dendritic connections in multiple parts of the brain of rodents, decreases synaptic density, and reduces myelination. Overall, the deficiency of just one vitamin has been shown to disrupt the entire structure and function of neurons and neural networks (Prado and Dewey, 2014).

### **Infections**

When an infant is exposed to an infection, neurodevelopment can be greatly affected. Almost half of the infants born from HIV-infected mothers have a chance of being vertically infected (Newell et al., 2004). As this issue became increasingly prevalent, solutions were brought about and adapted. Currently, what is recommended is a lifelong antiretroviral treatment for all pregnant females with HIV. Regarding brain development, HIV-exposed

children have had higher rates of suboptimal birth conditions before antiretroviral treatment. An increased chance of neurological mitochondrial dysfunction in HIV-exposed children was also present in one study. What HIV exposure does maternally is elicit immune responses, which, in turn, cause uncontrollable immune responses in children. This relates to neurodevelopment in that alterations in white matter and unusual neuron projections were seen. Relating to the effect of infection on brain development, the differences noticed between HIV-exposed and HIV-unexposed children will be discussed (Toledo et al., 2021).

### **Outcomes of Children who are HIV-exposed and HIV-unexposed**

Studies have been conducted that report impaired development in HIV-exposed children compared to the general population. Young HIV-exposed children have been shown to perform worse cognitively and in terms of motor skills. On the topic of abnormal birth conditions, HIV-exposed children with autism spectrum disorder (ASD) have greater amounts of white blood cell mitochondria (Budd et al., 2018). This associates a seen dysfunction in HIV-exposed children with disease related to affected brain development. In utero, important brain processes are occurring, but HIV-exposed children have a higher likelihood of being born preterm, disrupting vital maturation. Despite antiretrovirals having success in treating HIV, cognitive and motor neurodevelopmental aspects were seen to be inhibited in exposed infants. Deficits in understanding and expressing language were also seen in HIV-exposed infants (Toledo et al., 2021).

Contrary to the impairments of HIV-exposed children outlined above, other studies, having used treatment, have witnessed no major differences. When Nevirapine, a non-nucleoside reverse transcriptase inhibitor (NNRTI) or

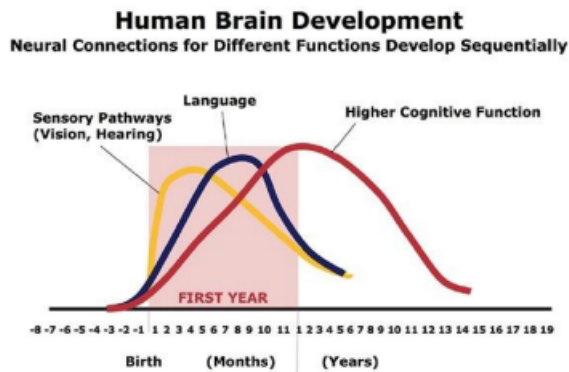
non-competitive enzyme inhibitor, was used for protection against vertical transmission, postpartum brain outcomes were reported to be identical between HIV-exposed and unexposed children. General antiretroviral therapy equalized the developmental performances of the two as well. Lastly, when brought to terms, HIV-exposed children presented without any deficits in brain development (Toledo et al., 2021).

### **Social Exposure**

Social exposure is another, very different factor that affects neurodevelopment in that it hinges on interactions and experiences with others and the outside world. A child cannot be isolated in order for them to have complete brain development. Rather than staying idle, children learn best by being active. Actions representative of certain language better translates to understanding such language than just reading or hearing it (Pica, 2014). For example, engaging a child in climbing *up* a ladder or crawling *through* a tunnel may better stimulate learning of such prepositions, rather than just reading to a child those words. Social interactions should also take place to build vital parts of the brain and the neural networks within them. This basic learning serves to build a brain foundation that can later be modified and expanded upon. Primary brain development occurs in the first five years of life; the overarching processes at certain age periods (see Figure 1) and how aspects of social exposure relate to them will be outlined (E. Berkley and R. Berkley, 2016).

### **Figure 1 (First Discoverers, 2022)**





### 3 to 9 months

During this early postnatal period, apoptosis is occurring. Engagement is crucial in order to repeatedly activate and strengthen neural pathways. If this did not occur frequently enough a foundation would not be properly built to be accessed in the future. Because the infant is acclimating to the environment, the five senses (seeing, hearing, smelling, tasting, and touching) are used greatly. This, in turn, strengthens the neural connections between each sense organ and the brain. Specifically, regarding the eye, cells in the retina become developed and start transmitting photons through synapses to the occipital lobe, which is correlated with vision (E. Berkley and R. Berkley, 2016).

### 10 to 14 months

Shortly after the five senses become utilized, their neural associations still continue to build. The actions of crawling and walking, with assistance, are reinforced, improving motor skills and the corresponding brain cortices. Further environmental familiarization builds the immune system and several organ systems as they have to fight illnesses. Not only is one's overall health fortified, a memory of the internal actions and external feelings associated with sickness is created, which can be retrieved. More communication occurs, primarily by gesturing, that leads to language acquisition from associations made with actions. At this

stage, improving on the developmental skills explained above and building full-body function is difficult without adequate exposure. Everything learned and remembered is associated with a memory, but they cannot be formed without attributes to correspond them with. Experiences derived from exposure are such attributes (E. Berkley and R. Berkley, 2016).

### 15 to 24 months

At this point, not just the legs are being involved, but the hands more so, as well. Synapses and neural pathways associating actions with the hands to the brain are activated just as they were and are continuing to be with the legs. Memories of learning movements with the hands are created and will be constantly accessed and strengthened as motor skills improve, turning into habit. In correspondence with the increased usage of the hands, play becomes more vital as infants aim to understand how objects work ("15-18 months: toddler development," 2022). Experimentation with the environment translates into memories of how certain objects function, which will be retrieved again and again as one comes into contact with such objects. Lastly, social activity becomes increasingly important as infants learn to stimulate areas of the brain for language (E. Berkley and R. Berkley, 2016).

### 2 to 3.5 years

Development gets to be more complex during this stage as the infant starts to associate the five senses with experiences. One obtains a deeper understanding of objects in the environment by learning their unique attributes and stimuli. Pertaining to the environment, a toddler becomes more spatially aware; one's motor skills are advanced enough to move and view objects in all dimensions. As in the prior periods, social interactions are vital. However, now children must retrieve and



express past experiences to resolve problems, whose memories will be stored in neural pathways as well (E. Berkley and R. Berkley, 2016).

### 3.5 to 5 years

Although interactions with other children, not just through language but with gestures as well, have already been occurring, during these years, the concepts of negotiation and sharing are learned. As with all the previously acquired skills, these two are associated with experiences and stored as memories which are called upon in the future. The brain continues evolving to function in everyday life and to react and grow from experiences. Synapses strengthen and prune (synaptic plasticity) in accordance with knowledge being both recalled and unused. One becomes more independent alongside the neurodevelopment that occurs from exposure. In all, development over the ages is information being learned and either retrieved or purged. Social exposure is indispensable when it comes to having a well rounded brain development. The structure of neural networks constantly adapts to experiences faced in everyday life (E. Berkley and R. Berkley, 2016).

### Conclusion

Having an adequate amount of certain nutrients, protecting from neurodevelopmentally harmful infections, and staying active and socially engaged are important to ensure that the brain grows to become and adapts to remain fully matured. Firstly, the primary processes of brain development were discussed. The effect of not having the optimal amount of certain nutrients, both during the prenatal and postnatal periods, on such processes was explained. Secondly, a comparison between HIV-exposed and unexposed children was made, in regard to their overall success in neurodevelopment. Lastly, a timeline, from early postpartum to age

5, of the importance of social exposure as it relates to brain maturation was displayed. The brain, despite much research, still remains one of the most mysterious organs in the human body. What really are the “perfect” decisions to make, taking into account all the known and unknown factors of neurodevelopment, to yield the ideal, fully formed brain?

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# An Essay on Refugees

By Yueer (Ariel) Zhang

## **AUTHOR BIO**

Born in China and raised in Canada, the immigration process has never been easy for Yueer (Ariel) Zhang. She has always suffered from the idea of fitting in and thus she wishes to tackle the issue of forced migration. Interested in art and refugee issues, in grade 11 she decided to become an art teacher for refugee kids at Matthew House. From working with the students she understood the struggles of asylum seekers and decided to start a fundraiser for refugee students through the idea of an art book. Similarly, she decided to put her critics and thoughts about forced migration into words in an essay and publish it, hoping to reach a larger audience and encourage more people to talk about such issues.

## **ABSTRACT**

This essay explores some of the issues that refugees face, citing examples across a range of national contexts. The author highlights important aspects of refugee crises and glosses some of the key concepts associated with these issues and events. The essay presents a case for greater attention to this important matter.

**Keywords:** *Refugees; asylum seekers; inequality; United Nations.*

## INTRODUCTION

Violence, lack of food, sexual assault, diseases, death: these are the realities of the refugee crisis. Countless news stories and reports testify to these conditions. In August 2015, an abandoned refrigerator truck crammed with the bodies of 59 men, eight women and four children was discovered near the Hungarian border (Learn German, 2022). The refugee crisis is a worldwide problem and will remain so until governments and people collectively work together to solve them.

The definition of refugees according to the United Nations High Commissioner for Refugees (UNHCR) are: people who have fled war, violence, conflict or persecution and have crossed an international border to find safety in another country.

There have always been refugees for people who have always been escaping conflict. Yet, as a society our response to these people has not improved. The reactions of the Canadian media today still carry the same whiff of xenophobia and racism that exemplified the treatment of European religious refugees in the 16th century. Our systems and thinking are stagnant. For example, Venezuelan refugees began fleeing their country in 1983 due to an economic crisis, the result of falling oil prices, international sanctions, and the country's business elite (UNHCR, N/D). Yet, in 2022 this is still one of the biggest refugee issues to remain. Such stagnation cannot be allowed to continue. In 2022, we stand at the edge of a cliff. Soon we will no longer be able to ignore these issues: the refugee crisis is only going to get worse as the climate emergency becomes more urgent. Millions of people are going to be displaced. This article will explore both what nations can do to best respond to the refugee crisis and what power individuals, even high school students, have to relieve the situation.

## Leaving a homeland

There are three main reasons why an individual chooses to leave their community and country, and seek a life elsewhere. Statistics show that refugees mainly come from undeveloped nations, states which are facing both ongoing civil issues and the consequences of climate change (Red Cross, N/D). These countries, defined as less economically developed with little industry and little investment in education, health care, and other infrastructure, are expected to suffer the greatest impacts of climate change. Rising temperatures are causing famines and droughts. Unable to feed their families, people are fleeing their homes. According to the UNHCR, more than 20 million people have left their homes due to climate change issues each year (Red Cross, N/D). With no current solution to climate change and global temperature change set to rise to 2.4 degrees, this number will only continue to grow with even more people forced to flee.

The other contributor to immigration is gender and sexual inequality. Over 73 countries imprison and place death sentences on same sex relationship. Not only that, sexual assault rates, crime rates, death rates are all factors for someone to flee their country. Many who flee their countries for these reasons have a harder time finding a job in a new nation. Discrimination is seen in all states and although some do not give death sentences, transgender individuals' poverty rate is still high for countries that make up about 30% of the global population (Badgett, 2019).

Globally, many countries are also at war. 60 million people have been displaced because of the ongoing conflict in the middle east (Lynch, 2017). While the country's government is at war, it is the citizens themselves who face the consequences. In Yemen a failure of a political process created to bring stability to the country, following an uprising in 2011 that forced its long-time authoritarian president, Ali

Abdullah Saleh, to hand over power to his deputy, failed. Abdrabbuh Mansour Hadi's inability to lead his own country caused an estimated 233,000 deaths, including 131,000 from indirect causes such as lack of food, health services and infrastructure. Tens of thousands of civilians have been killed or wounded as a direct result of the fighting, including more than 10,000 children by the end of 2020 (Shaoul, 2021). Thus, these people have no choice but to flee their land. The choice to leave is often only the beginning of an immigrant's difficulties. Many who did not make it to immigration camps were often stripped, robbed, and sexually assaulted.

### **The reality that refugees face**

Refugee camps are often overcrowded and unsanitary, lacking basic provisions. According to the non governmental organization Unite For Sight, 30% of refugee camps do not have adequate waste disposal services or latrines (Unite For Sight, N/D). Not only that, many refugees face the issue of communicating, finding a job, getting money for food, and are discriminated against due to xenophobia and racism. A study by Portes and his colleagues demonstrated that 26% of refugees who have stayed in their relocated countries for over 3 years still face discrimination due to the media's portrayal of refugees as criminals due to their "illegal" way of entering the country (International Organization for Migration, 2020). Often, refugees and migrants are blamed for society's social and economic woes, such as increased crime and unemployment. All of these trends have contributed to an alarming increase in racist violence and xenophobia against refugees.

Canada is not exempt from this phenomenon. Canada has reportedly one the highest quality of living standards across the world, yet the pandemic exposed how Canada has mistreated newcomers struggling to join our

nation (Jones, 2020). While many Canadian legal residents have been able to access government programmes to help them cope with the pandemic's socioeconomic effects, refugees are unable to participate in Canadian relief programs. Not only that, although we are accepting refugees, many face the issue of having no identification and are still in a state of being displaced – a condition in which a person has crossed national boundaries and cannot or is unwilling to return home due to a well-founded fear of persecution. It takes many years for refugees to be granted the protection of citizenship.

### **To improve as a nation**

Although the suffering caused by displacement continues, organizations like the UN do the bare minimum, despite clear measures that could alleviate these issues. Two three steps in particular could drastically improve conditions: Nations making it easier for refugees to travel and prioritizing the lives of the refugees, providing better care and support systems at their borders and in-country. I will explain each in detail in the following paragraphs.

The most treacherous aspect of a refugee's journey is their attempts to flee, cross territories and enter borders. As such, the greatest impact can be made by easing this process: nation's must allow refugees to travel from nations with greater ease. As we all know, the route to resettlement for refugees is extremely dangerous and many die on the way to a new country. Developed nations with high GDP should be opening up safe and legal routes for refugees so they can reach and seek asylum without having to cross the sea in overcrowded boats or walk hundreds of miles carrying their children and belongings. There is a UN system called resettlement, designed to protect the most vulnerable refugees. This allows people to travel to another country, usually by plane, and settle

down for good. An estimated 1.38 million people will need to access this system globally over the next two years. (Amnesty , 2015) However, this system is only accessible to the most vulnerable refugees, such as torture survivors and people with urgent medical needs. Those who do not qualify are forced to make treacherous journeys themselves. This kind of scheme should be implemented by all developed nations. Many refugees lose their life trying to travel to a safe place and as a society; we should work towards a future where people can safely settle into their new homes.

Not only that, nations should be ensuring life as the first priority. One of Italy's leading human rights and immigration experts, Fulvio Vassallo Paleologo, professor of asylum law at the University of Palermo writes how recent reports suggest an increase in deaths of migrants attempting to reach Europe "In this context, deaths at sea since the beginning of the pandemic are directly or indirectly linked to the EU approach aimed at closing all doors to Europe and the increasing externalization of migration control to countries such as Libya." (Tondo, 2021) We say the lives of people are the most important but nations are putting fencing up, and pushing refugees from even entering their country. Many risk their lives to travel to nations only to be blocked back from entering because they don't have travel documents. So how do we solve that? For one, many refugees lack the documentation required to get a standard travel visa. Countries can allow refugees to travel securely and seek asylum when they arrive by providing them with a humanitarian visa. Furthermore, all nations should look into and prosecute human trafficking organizations that prey on refugees and migrants, putting people's safety first. We need to work towards a future that allows refugees to travel and settle in countries without threat.

Once settled, the next issue to tackle is combating Xenophobia and racial prejudice. Currently, governments blame refugees and migrants for economic and social difficulties. After violence and looting erupted in April and May 2015 in Durban, South Africa, at least four people died, many more were gravely injured, and over 1,000 Burundian and Congolese refugees were forced to escape (Amnesty International, N/D). Refugees who have already faced so much trauma traveling, proceed to live in a society that simply looks down on them. For one, all these developed nations fail to establish solid refugee systems, which include letting individuals request for asylum, evaluating their claims fairly, resettling the most vulnerable, and providing basic services like education and healthcare. We as a society fail to do the bare minimum for refugees, none of what I have stated above is hard to achieve for developed nations but we still fail to provide for them. This is where we as a society fail.

### **In the eyes of a teen**

As the UN set goals to solve world issues, it is in the youth's responsibility and power to abide by them. On September 25th 2015, 17 sustainable development goals were adopted by 193 member states of the United Nations that aim to eliminate poverty and hunger, protect the environment from climate change, achieve gender equality and raise living standards by 2030 (UN, 2015). Who is the UN expecting to achieve these goals? The new generations. As teens are expected to do all these things, how can they do it? Let's take the idea of climate change for example. We all know we have to be sustainable with our resources however as we look at now, not many abide by that idea. However, as the older generation fails to abide by those sustainable goals, it is the younger generations responsibility to abide by them. Change does not happen over time but if these sustainable ideas into our daily lives it is



only a matter of time before it starts showing positive progress. We must care about these growing concerning issues and we must change our lifestyle for it to go in a positive direction. Like what Jemi Laclé, Chair of the World Bank says, “Development is a dialogue for and by the youth,” let’s develop into a better future for our society (Lacie, 2016).

Taking a deeper look at these issues, it is easy to feel hopeless. And yet, it is important to understand that the first step in forcing nations and institutions to create change, lies with us: highschoolers and young people. Many of us live in a privileged society with free education and I believe that is the route to solving this global issue as a teenager. As many of us focus on ourselves with global issues passing us by. This is partially a fault of the system we inhabit; education should be the most fundamental tool to create change. If a society wishes for change, teenagers are the key: we are the next generation. As teenagers start entering the workforce, knowledge of world issues is key. We cannot be expected to make justified, moral and actionable change if we have not been introduced to the realities which require our problem solving skills. An example would be schools talking and bringing up relevant world issues today such as the new abortion law, the Yemen crisis, and of course the refugee crisis. more often instead of just the core subjects. The schools should thrive to often achieve activities such as: Invite guest speakers, start deep conversations in the classroom about world issues. However the responsibility for educating our youth does not only rest in the classroom, it also lies with high schoolers themselves. way to stay updated on world issues through news, social media or even a family member. Take a class on world issues and understand the issues in society today. Stand up if you believe there is anything wrong with the world and try to make an impact by voicing your opinion. There are over 7 million youth across the country, aged 15

to 29 in Canada alone and through education, we can make sure the next world leaders are attuned to the plight of refugees and are able to respond to this crisis with compassion and realistic action (Statistic Canada, 2019).

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# **The Importance of Peer Interaction in the Development of Social Skills During Adolescence: Growth During the COVID-19 Pandemic**

**By Stella Wang**

## **AUTHOR BIO**

Stella Wang is a student with a keen interest in science and art. Fascinated by the intersection of computer science and psychology, she continually seeks opportunities to deepen her understanding of mental health and its relationship with technology. Stella is dedicated to empowering young women in STEM by providing education in diverse technology sectors, artistic expression, and mental well-being. As a student, she is eager to learn and to share her insights and discoveries to promote a better understanding of mental health within the rapidly evolving landscape of technology and psychology. Stella is interested in pursuing a career that studies human-computer interaction.

## **ABSTRACT**

This article examines the impact of COVID-19 and lockdown on adolescents' social skills development. Adolescents are in a critical period of social skills development, and peer interactions are essential for fostering social competence. The pandemic limited traditional face-to-face interactions, which may potentially lead to long-term effects on adolescents' social development and increase susceptibility to peer rejection. Digital connections, such as social media, can serve as potential buffers against the effects of COVID-19. Parental support is important in promoting adolescents' social well-being and mental health.

**Keywords:** *Adolescents; social skills development; social competence; COVID-19; lockdown.*

## INTRODUCTION

As the COVID-19 virus spread across the world in 2019, public facilities were suddenly shut down and people were encouraged to socially isolate in order to stop the virus's spread (Centers for Disease Control and Prevention, 2022). One group in particular, adolescents, was severely affected by the social isolation policies put in place during the pandemic. Adolescents are in a developmental period where they are starting to develop more complex social peer relations and behaviors in their transition to adulthood (Brown & Larson, 2009). As face-to-face interaction decreased during the pandemic, these important peer interactions also became extremely limited.

While examining the relations between peer interaction, the pandemic, and social well-being in adolescents, we must also consider how to maintain healthy growth and development during these irregular times. As studies have shown, peer interactions are essential to social development in adolescence (Blakemore, 2012). Social isolation due to the COVID-19 pandemic could lead to a regression in social skills (de Miranda et al., 2020). As a result, some adolescents could have difficulty readjusting to society. Some of these behaviors may also increase adolescents' susceptibility to peer rejection. With these effects in mind, parental figures, practitioners, and policymakers have a responsibility to uphold adolescent social well-being and promote healthy social skills development during the pandemic.

### **Social skills development during adolescence**

Adolescence is a developmental period in which individuals are more sensitive to their social surroundings (Blakemore). During this time, teens are developing skills to help them navigate their social world. As people grow, they start to gain a better understanding of

how to interact with the people around them in a "socially acceptable" manner, notably, the process of mentalizing. Mentalizing is the ability to comprehend the intentions and mental states of others from visual or social cues, implicitly or explicitly (Frith & Frith, 2003). Adolescents usually have reasonable awareness of different mental states for each individual. Understanding others' mental states is important in helping people adjust their actions according to the other person's conditions, allowing them to act in more socially acceptable manners (Blakemore, 2012).

Adolescents' social skills grow during adolescence as they start to learn how to interpret others' actions and behaviors in a more complex and developed fashion (Blakemore, 2012). As an individual transitions from youth to adulthood, they are able to process interactions at a higher level that can further support their integration into their social world. In this manner, mentalizing is an essential attribute of social interaction skills in adolescence that continues into adulthood (Devine & Apperly, 2021). As an individual becomes more attuned to the behaviors of others, their ability to appeal to others grows as well. Adolescents use the social skills gained from this developmental period to help integrate into society.

### **The importance of peer interactions in enhancing social competence**

Peer interactions are of utmost importance to the social development of adolescents. These interactions teach adolescents social competence, preparing them for adulthood. Adolescents are at a stage where they are exposed to many more diverse social situations as they are starting to join the workforce along with other transitions into adulthood. However, a great portion of the

interactions during this developmental period are still in the classroom and with friendships. As adolescents become more socially adept they also grow more susceptible to peer rejection and acceptance (Pfeifer & Blakemore, 2012). This means that as adolescents become more conscious of other people's mental states, they also grow more wary of how those people will react to their actions and behaviors. Different people would have different responses to this development and may have a harder time integrating themselves into society.

Past evidence has shown that those with good social skills have a better time adjusting while those with worse social skills find it harder to adjust (Brown & Larson, 2009). Healthy friendships can help an individual with these social adjustments as they have been shown to positively impact an individual's ability to adapt to various situations or environments (van Harmelen et al., 2017). Therefore, having positive peer reactions benefits the adolescent by improving their adaptability to a social situation both in the present and as a long-term effect. The results produced from peer interactions enhance adolescent social competence and are an integral part of preparing people for the greater social world.

### **The COVID-19 pandemic and social isolation**

The COVID-19 pandemic called for physical isolation, which led to a decrease in social interactions. As the pandemic worsened, schools were shut down, most work, if not all, was conducted from home, and very rarely did people leave their residences. Even when meeting, everyone was advised to wear masks and socially distance. Given that schools are the main form of physical socializing teens have, school closures severely limited opportunities

for face-to-face interactions. Instead, physical interactions became limited to exclusively immediate family members.. Routines were abruptly changed, interrupting many facets of life for adolescents. . During the early stages of the pandemic, more than one-third of adolescents reported high levels of loneliness (Loades et al., 2020). This was especially the case for extroverted adolescents, who reported the highest levels of loneliness and depression (Branje & Morris, 2021). Considering that adolescence is a period where peer interactions are key for social skills development, social isolation is highly detrimental to the development of social skills during this time.

Social isolation could possibly leave long-term effects on social behavior, which may make it more difficult to readjust to society. Some of these behaviors may also increase adolescents' susceptibility to experiencing peer rejection. Consistent with this idea, many children and adolescents showed more clinginess, inattention, and irritability during the pandemic (de Miranda et al., 2020). These behaviors and circumstances may hinder the social development of adolescents and might negatively impact their social skills. Evidence has shown that behavioral problems and social competence are negatively correlated, and that increased behavioral problems, such as irritability and aggression, are associated with decreased social competence (Hukkelberg et al., 2019). With lower social competence and increased difficulty readjusting to society, adolescents may be even more susceptible to peer rejection.

Another notable matter is that mental health problems seemed to become much more severe, especially in the earlier stages of the pandemic. Depression, anxiety, and stress were highly prevalent in adolescents, with about one-third to one-half showing symptoms of

each (de Miranda et al., 2020). While social distancing is being encouraged and enforced as necessary, it is also worsening the mental health problems and social capabilities of teenagers, preventing them from receiving the social interaction needed for healthy development. This could be another manner in which the COVID-19 pandemic is stunting the development of adolescent social skills.

### **Maintaining social wellbeing during the pandemic**

While the threat of social isolation is still present, digital connection could serve as a potential buffer against feelings of isolation among teenagers. It is clear that COVID-19 caused a severe decrease in face-to-face interaction and physical isolation. However, people were still able to interact digitally, which softened the impacts of physical isolation. As the pandemic persisted, schools found ways to transfer learning online using video calls; people also used social media, text messaging, and phone calls to stay connected. Social media, in particular, is instrumental to socializing while also distancing (Guessoum et al., 2020). Further, social media platforms are now commonly used to circulate up-to-date information on current events, which can be extremely beneficial to adolescents.

As the closest pillar of support during the pandemic, it is vital for parents to support their adolescent children in maintaining and improving social competence. One of the steps parents can take to promote social well-being is to support their child's mental health, as research indicates that poor mental health is linked to poor social functioning (Kupferberg et al., 2016). Actions like teaching the child how to cope with stress or helping regain a daily routine can make a significant difference (Singh et al., 2020). Additionally, parents and guardians can support adolescents by helping them get

professional treatment. Studies have shown that psychosocial interventions can help adolescents in handling the impacts of events like the COVID-19 pandemic (Guessoum et al., 2020). Over the course of the pandemic, teletherapy has also become more popular and is an option for professional help. There has been an increase in telehealth options such as phone therapy and therapy via video calls, which has shown to be effective and well-received by adolescents (Sweeney et al., 2019). It is important that adolescents receive adequate help in order to develop in a healthy manner.

### **Conclusion**

Adolescents are in a highly important stage for social development that is threatened by the COVID-19 pandemic. With limited social interaction with friends and peers, the development of social competence that usually takes place during adolescence can be stunted. Social skills, as a whole, can regress as well. However, with the possibilities of the digital world, the impacts of restrictions on physical interaction can be minimized through online communication and social media. The Internet contains many risks as well, though. More research on ways to ensure appropriate internet use for teens is needed to minimize the dangers of digital connection as a means of support for adolescent development. Moving forward, safe and accessible options for maintaining social well-being can be further explored to prepare for safe adolescent social development in isolated environments.

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