



NIVEA



**The State of
Human Touch**

**Benefits, Barriers,
and Solutions**

GLOBAL REPORT 2020

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and Solutions

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**Foreword by Ralph Zimmerer,
Vice President Global NIVEA Brand & Design**

With this global report about the state of human touch in the world – a first of its kind – NIVEA puts the focus on the key role that physical and emotional touch plays for us humans.

It is about nothing less than what unites us as human beings: we are all naturally social and thrive on human connections. And while we know scientifically that human touch is key to living a happier, fulfilled life, there is increasing evidence of its decline in the daily lives of people around the world. At the same time, a feeling of isolation is on the rise globally.

During the last ten months, our team at NIVEA has been working closely with scientists and research institutes to deeply understand the benefits of human touch for health and well-being, and to explore the current state of human touch. Marc Bornstein, a renowned scientist on human touch, contributed a holistic scientific review on human touch, clearly stating that human touch can be as essential for us as oxygen and water. The research institute Mindline interviewed people around the globe and helped us to identify the main barriers that prevent us from enjoying human touch benefits in modern times as well as to highlight significant knowledge gaps about its benefits.

Skin is the pathway to touch, and for us at NIVEA, skin has always come first. With the launch of NIVEA Creme in 1911, we revolutionized skin care with the first stable oil- and water-based cream and helped make skin care accessible for everyone, everywhere. All the way, we had one thought in mind: how to keep skin healthy and beautiful, so we can help make people feel good in their skin and thereby inspire more human touch.

Understanding the important link between human touch and leading happier, fulfilled lives, NIVEA has set up “The Power of Human Touch” project. It is our global initiative to inspire more human touch in our world, reminding everyone of its benefits and importance. Additionally, we are attempting to bring more human touch to future generations by financially supporting programs that promote human touch and connection. Through this, we want to contribute to creating a society that feels less isolated and is more in touch with one another – both physically and emotionally.

On a more personal note: since working in the area of human touch, I am much more aware of how I am in touch (or not) with people in my daily life, whether at home, with friends, or with my team in the office. I try to make an extra effort to reach out and connect closely with the people in my life every single day. And, I can tell you, it feels amazing ☺.

Let’s get in touch!

RALPH ZIMMERER

Are We Becoming a Society Out of Touch? A Tale of 11 Countries.

New Global Research Reveals That Human Touch Is Key to Happy and Fulfilled Lives, Yet at Risk around the World

In the 1960s, American researchers conducted a series of studies in order to better understand the nature of human love and affection. The most famous study, known as the controversial “wire mother experiment,” involved separating young rhesus monkeys from their natural mothers soon after birth and giving them a choice between two different surrogate “mothers” – one made of soft terry cloth, and the other made of wire and holding a bottle of milk. The young monkeys, missing their mothers and desperate for comfort, overwhelmingly chose to spend time with the cloth mother, even though the wire mother fed them. This suggested to researchers that contact comfort – i.e. touch – was just as important to the monkeys, if not more so, than actual sustenance¹. Even more surprising, when the cloth mother was removed, the monkeys became agitated and withdrawn, suggesting that the comfort they derived from the cloth touch was an important source of security.

While the wire mother experiment has been rightly criticized for its unethical practices, more than 50 years later it continues to shape our understanding of the power of touch when it comes to our physical, psychological, and social development. The scientific community today is in clear agreement about the importance of touch. Prof. Tzipi Strauss, Director of Neonatology at Sheba Medical Center, summed it

up succinctly: “There are three basic needs in order to survive: oxygen, food, and water. And I want to suggest a fourth one, which is touch.”²

If touch is so essential to our lives, then our modern lifestyles spell real trouble for our collective health and development. It’s one thing to produce scientific evidence on the importance of human touch, but it’s quite another to make room for touch amid today’s

Methodology

The NIVEA research was conducted by Mindline, an independent research institute, as an online survey of 11,198 people in the following 11 countries (approximately 1,000 respondents per country): Australia, Brazil, China, France, Germany, India, Italy, South Africa, Thailand, the UK, and the US. Survey respondents were between 16–69 years of age, and were a representative sample based on gender, age, region, and occupational status. The study was conducted between October 2018 and March 2019. Focus group discussions in 11 countries, conducted by Happy Thinking People, an independent research institute, preceded the quantitative research.

¹ <https://www.verywellmind.com/2795255>

² <https://youtu.be/mKkF6mAlX4k>



Wolfram

Times of touch and loneliness can alternate like the rhythm of the tides. Wolfram’s indications about the amount of human touch he receives are as precise as they should be for a former computer expert: he spends four-fifths of his time alone, and one-fifth with neighbors, passers-by, or friends. A few months ago, a girlfriend visited more regularly and stayed overnight at his home on the banks of the river, where he has lived for 14 years and counting. “When the weather changes and the storms come, the busy life stops. I am here just by myself, enjoying the peace and quiet.”

HAMBURG, GERMANY

digital revolution, our jam-packed 24/7 schedules, and deeply rooted or recently evolving social norms. After all, we are a diverse global society with many specific life challenges – we are single parents, caretakers, shift workers, breadwinners, students, powerful executives, unemployed people. Our individual circumstances may differ, but our predicament is the same: we're connected yet disconnected. We're a society in transformation, with more and more ways to connect with others, yet less and less time and ability to do so. The sheer volume of recent research on the lack of touch suggests that our transforming society is facing an epidemic of touch deprivation on a scale that threatens our individual mental and physical health as well as the strength of our communities.

If touch is so essential to our lives, then our modern lifestyles spell real trouble for our collective health and development.

To better understand the growing epidemic of touch hunger and the state of human touch today, NIVEA commissioned a global study of 11,198 people in 11 countries on six continents to measure people's experiences with and attitudes toward human touch. The newly released results show substantial differences between cultures, genders, and age groups when it comes to barriers to touch, yet the importance of touch in people's lives and the desire for it are nearly universal. Through personal touch diaries, in which respondents were asked to memorize every single time they had physical contact with another person, and in-depth questions about what is preventing people from connecting, the NIVEA findings reveal a fascinating window into the status of human touch in today's society and people's universal longing for that most human of experiences.

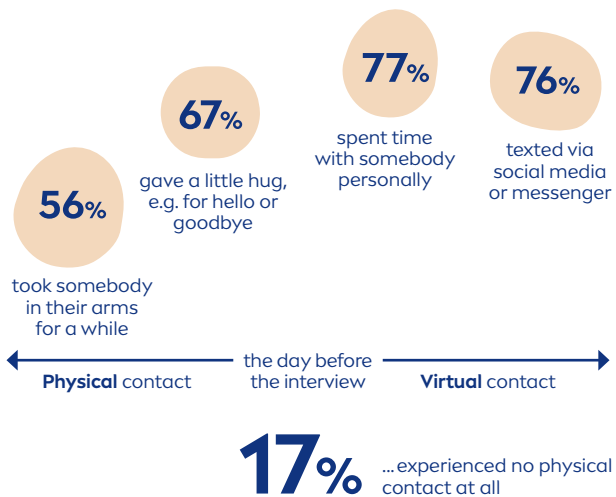
Touch Makes Us Human, Lack of It Makes Us Feel Stressed

All human touch is not created equally, with some forms more desirable than others. Hugging a friend,

kissing a partner on the cheek, or giving a colleague a fist bump or high five are all preferable to bumping into a stranger, for example. Despite these varying preferences for physical touch, the global survey findings show that touch has overwhelmingly positive connotations for most people. The top three associations that respondents have with touch are love (96 percent), affection (96 percent), and care (95 percent). The idea of caring for each other is closely linked to human touch in people's minds, and this is consistent across all age groups and geographies. Nine out of ten people around the world feel that human touch is key to leading a happy, fulfilled life. In today's highly polarized world of filter bubbles, hate speech, and hyper-partisanship, it is significant that no matter what age group, gender, or country of origin, people everywhere agree on this one statement.

This unity is reflected in other measures of touch, as well: 87 percent agree that human touch is an essential part of communities, and that a lack of human touch can make you feel isolated, even if you are surrounded by people; 85 percent agree that touch is what makes us human; and 81 percent believe that a lack of human touch can make us feel more easily stressed. As researchers, we wondered: Is a lack of human touch caused by our lifestyles? And can more human touch be a remedy against the negative developments of modern times?

Virtual Connections Exceed Physical Contact



Source: Mindline Research 2019



Christopher

Christopher, 25, lives in Slagelse, Denmark. The software developer and chairman of the Danish Red Cross Youth is an adopted child from Vietnam. "I don't know where I'd be today if it wasn't for my parents, who support my ambitions and dreams in a big way." One of those ambitions is to make a difference in people's lives and care for those who are in need. Christopher and his girlfriend Laura support a center for lonely young people. "Some of them have not felt human touch in a year. A hug means the world to them."

PLEXUS, SLAGELSE, DENMARK

Portraits of People In and Out of Touch

Not every touch is equal. Each person has his or her own unique way to show care, comfort, love, joy, respect, or recognition with a touch. In October 2019, we asked the Hamburg-based photographer Oliver Lassen to unlock stories of human touch and its absence. The journey took us to Brazil, Dubai, Denmark, and Germany, where we met and listened to eight individual stories of human connection and touch. A big thank you goes to those who welcomed us to their homes and hearts.

Lene and Pernille

"Neither I nor Lene received that kind of love and attention growing up, and we don't want our children growing up missing the same things that we did. The worst for us would be if they, when 42 years old, will say: 'We didn't get enough love and cuddles growing up.' Being happy as a family requires continuous effort to ensure everybody feels recognized and comfortable. But love and human touch help to bridge any differences." Pernille, 42 years old and autistic, and Lene, 36, have been married since 2008. The mothers of two children live just outside Copenhagen.

For Two-Thirds, Touch Is Not Part of Their Daily Lives

Our research found that most people are not experiencing as much touch as they would like. When asked specifically about the type and frequency of touch they experienced, 64 percent of respondents indicated that touch is not a daily occurrence in their lives, and another 72 percent expressed a wish for more hugs. Nearly one in five respondents had not experienced any physical contact at all the day before the interview. Furthermore, not only are people dissatisfied with the level of touch in their personal lives, half of respondents perceive the level of touch in society as having decreased in recent years. All of these findings suggest a growing trend of what experts refer to as “touch hunger,” or touch deprivation – and some groups are more vulnerable than others.

Nine out of ten people around the world feel that human touch is key to leading a happy, fulfilled life.

According to the data, there seems to be different levels of touch between countries more in the north and southern countries. Whereas 17 percent of respondents overall indicated experiencing no touch the day before the interview, this figure was higher in places like the UK (29 percent), Germany (28 percent), and France (21 percent). On the flip side, it was lower in places like Brazil (12 percent) and Italy (7 percent). Interestingly, those countries that experience the most touch also seem to want the most touch. While 72 percent of respondents overall indicated a wish for more hugs, 77 percent of those in Italy and 81 percent of those in Brazil wished for more, compared to 63 percent of Germans and 64 percent of Britons. “The data shows that people who live in cultures that are more ‘touch-friendly,’ such as South America, are more likely to recognize the value of touch and seek out more touch in their everyday lives,” said Dr. Natascha Haehling von Lan-

zenauer, researcher from Happy Thinking People, an independent research institute that conducted focus group discussions ahead of the quantitative survey.

People aged 50–69 face unique challenges when it comes to touch.

In addition to cultural differences, the data also revealed differences in touch experiences across age groups. It should not come as a surprise that millennials aged 20–35 and those with children in their households – regardless of gender – experience the most touch, based on the touch diaries. Also, 69 percent of those with children in their household and 67 percent of millennials reported that touch from other people is a common and natural part of their daily lives, and that they receive a variety of forms of touch from a variety of different people. They were also significantly more likely to have embraced someone or held their hand the day before the interview. Whether the traditional forms of physical touch like hugs, holding hands, or cuddling, or Internet-based forms of contact like talking to someone via video chat, this age group and those who are parents benefit from touch daily and in abundance. However, the same can’t be said of all age groups.

50+ and Touch-Deprived?

People aged 50–69 face unique challenges when it comes to touch. They are more likely than other age groups to live alone or in smaller households, or face health problems that create barriers to touch. The rise of the “nuclear family” trend in recent decades, decline in marriage rates, and increased life expectancy around the world have made it increasingly likely that older adults live alone rather than with a partner or in multigenerational households. Across the board, people aged 50–69 reported fewer experiences with human touch in their daily lives compared to other age groups, including fewer hugs, brief strokes on the arm while talking, or opportunities to cuddle.



Salam and Nada

Modern times change the way we live and work, but family bonds stay as strong as they have always been. Salam, 56, named her first restaurant in Dubai – Bait Maryam – after her mother, who taught her to cook. While the whole family helps, it’s her youngest daughter, Nada, 24, who spends the most time with her, overseeing marketing and accounting in the restaurant while Salam cooks. In Arab culture, it’s the norm to hug and kiss your family all the time, says Salam. “It’s the happiest feeling having my daughter around me; I wouldn’t have picked anyone else to be with me by my side to help me grow my dream.”

Interestingly, despite experiencing less touch, this cohort doesn't appear to necessarily desire more, with only 63 percent indicating a desire for more hugs, compared to 72 percent of respondents overall. "People seem to adjust their expectations about the amount of touch they experience in their daily lives based on their circumstances," said Antje Gollnick of the research institute Mindline, which led the NIVEA study. "If they live alone or have health issues preventing frequent touch, they learn to desire less touch as a way to avoid disappointment."

Expecting less touch does not mitigate the need for more touch, however. Numerous other studies have linked loneliness and touch deprivation to poor health, with some experts going so far as to compare it to a chronic medical condition. Touch deprivation has been proven to lead to higher levels of stress, anxiety, and depression, and decreased immunity to illness. A 2013 study of older Britons found that loneliness was twice as unhealthy as obesity, and that lonely people aged 50–69 were twice as likely to die as their non-lonely peers³. Given their increased risk for both loneliness as well as age-related health problems, they need more touch, not less.

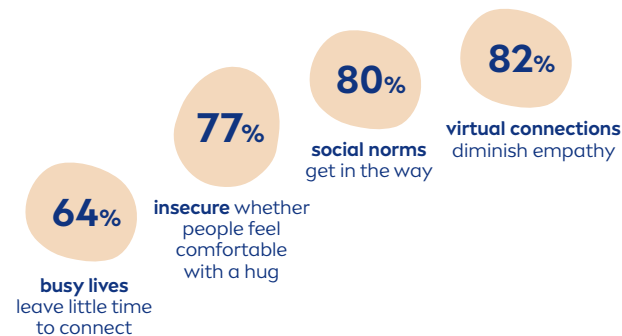
Consider, too, that one of the biggest trends impacting the world today is that of population aging. By the end of the year, for the first time in history, the number of people older than 65 will outnumber children younger than five years of age. In the next 25 years, the number of people older than 65 will double⁴. As this trend continues, the issue of touch deprivation will become an increasingly urgent public health issue. To reverse this trend, we will need to address the many barriers to touch.

Busy, Modern Lifestyles Are Driving – and Keeping – Us Apart

The NIVEA human touch study has found that a number of trends are creating new and lasting barriers to human touch. We live in a society that is increasingly mobile, with more people than ever before choosing to move away from their families and the communities in which they were raised, whether

due to geopolitical conflict, the pursuit of professional opportunities, or personal enrichment. Innovations in personal technology and improved broadband Internet access around the world have made it possible to stay connected to loved ones and form new connections virtually, rather than in person. And shifting social norms have raised questions about which types of touch are appropriate. The impact of these trends on the quality and frequency of human touch is reflected in the NIVEA research. Technology adoption, the nature of modern lifestyles, cultural and social norms, and personal insecurities were all cited as reasons why people don't engage in more personal touch.

Manifold Barriers Compromise Human Touch



Source: Mindline Research 2019

Connected Yet Disconnected: Generation Internet

The role that technology plays in our experience of human touch deserves a closer look. More than 80 percent of respondents to the NIVEA survey feel that more and more virtual connections diminish the skill of empathy, which leads to less touch. Other research has found that screens create not just physical but also psychological distance, blurring the lines between reality and entertainment and desensitizing us to pain and the needs of others. Can screens also make it more difficult for us to read others' emotions? Some studies suggest yes. A 2014 study by the University of California, Los Angeles found that sixth-graders who went five days without

³ <https://www.theguardian.com/science/2014/feb/16/loneliness-twice-as-unhealthy-as-obesity-older-people>

⁴ <https://www.forbes.com/sites/reenitadas/2015/08/11/a-silver-tsunami-invades-the-health-of-nations/#156c90343efd>



Tom and Noah

Can screen time create friendship? Tom, 24, and Noah, 18, are players in the virtual FIFA Pro League, representing the German football club FC St. Pauli. Three years ago, e-Sports brought them together. FIFA players take their own virtual team to win – just like a football coach. Despite fierce competition and many solo hours of screen time, the shared experience of training and passion for this young sport makes them closer. As for other sports, training takes place with the team being together in one place, their training room. It has become an important part of my life, says Noah. "No doubt we all want to be among the best – but look at us as a dedicated and respectful community, united by our love for FIFA. Spending so much time together helps to create a large social circle."

ST. PAULI MILLERNTOR-STADION, HAMBURG, GERMANY

exposure to technology were significantly better at reading human emotions than kids who had regular access to phones, televisions, and computers⁵.

Technology's role in our experience of empathy – or the lack of it – is an alarming and fascinating topic, and has urged companies like Facebook to invest in technologies that allow us to better express and experience empathy, such as the company's new social virtual reality (VR) app and the 2015 rollout of "empathy" buttons designed to allow users to express a range of emotions beyond mere "likes." Other technology companies have also taken steps in recent years to integrate empathy into their corporate culture, products, and services, and even their business models.⁶

"It is almost impossible to meet my friends. Everyone is so busy nowadays."

In addition to our experiences using technology, how much time we spend using technology also matters. A total of 53 percent of respondents said that time spent on social media was a barrier to physical touch, and this was particularly true in India (70 percent) and Thailand (69 percent) – countries where social media usage tends to be higher. A respondent in India told us, "When I come home from the big city two times a year, I long to see my family. But my little brother is only sitting at the table with his gadgets, not talking or even looking at me properly. That's so sad!" The data also reveals significant differences in age groups when it comes to time spent online. The biggest difference is between millennials and those aged 50+, where 65 percent of millennials reported that time spent on social media is a barrier to physical touch, while only 33 percent of those aged 50–69 did.

Busy Lives: A Never-Ending Race to Get It All Done

Our screens aren't the only things standing in the way of more touch. The findings also suggest that our busy lifestyles are contributing to our collective

touch deprivation, where 72 percent of respondents believe that the value of human touch is not top of mind in modern life, with another 64 percent reporting being too busy to take time to connect with others. A respondent in China told us, "It is almost impossible to meet my friends. Everyone is so busy nowadays." This is especially true for millennials (72 percent) and parents (71 percent). Even though we've already established that these groups experience more touch compared to others, 76 percent of millennials and 78 percent of parents still wish that they could receive more hugs.

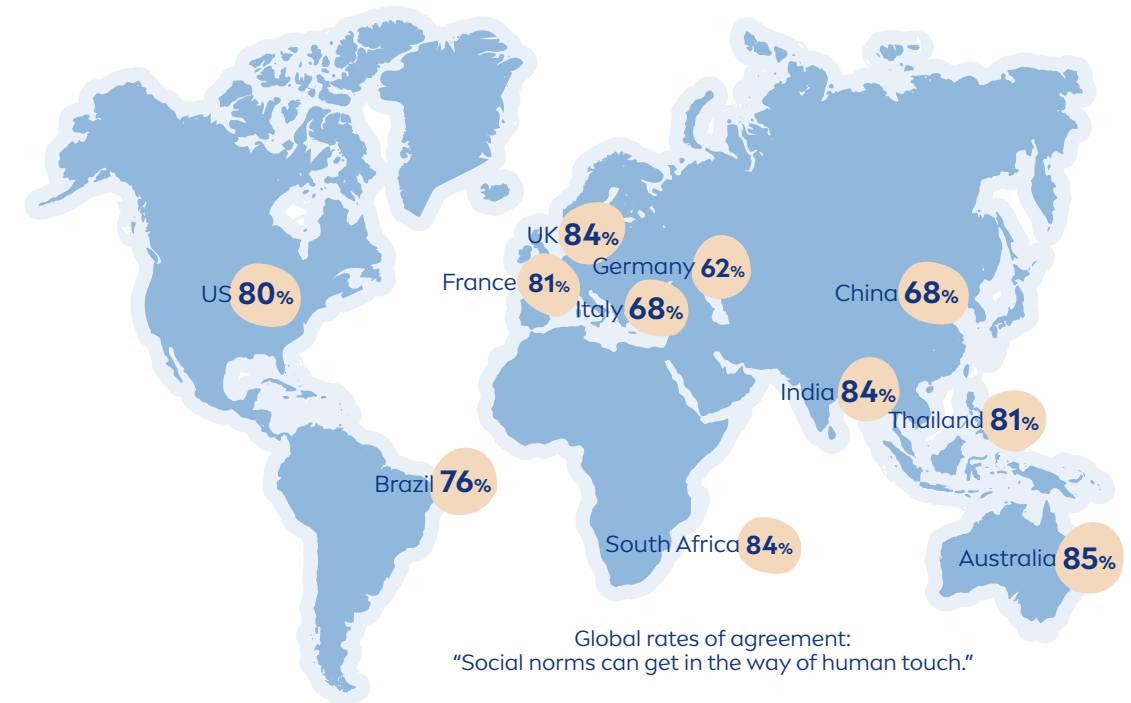
For these groups, career and family or household demands can stand in the way of making time for meaningful connections or even basic needs. A 2016 study of US millennials (adults aged 18 to 35) showed that a majority are concerned about their health but do not have enough time to focus on it⁷, and a 2015 Pew Research study showed that 53 percent of mothers and 52 percent of fathers in the US reported not having enough free time⁸. One respondent in the US said, "I always seem to be on the run, but otherwise I cannot manage to get everything done."

As a result of their busy, on-the-go lifestyles, these groups often have to rely on technology-enabled connections as a replacement for physical touch. In the touch diaries, 51 percent of millennials and 48 percent of parents reported that they had video-called someone, ran their fingers over the screen, and wished that it was a real touch.

Social Norms: Widespread Confusion about the Right Level of Touch

In addition to technology usage and lack of time, eight in ten respondents believe that social norms can get in the way of human touch. In some countries, this is more of a factor than in others. It appears to be more of a barrier in Commonwealth countries, with 84 percent of Britons, 85 percent of Australians, and 84 percent of Indians reporting social norms as a barrier to touch, compared to 80 percent of respondents overall. Generally speaking, people in those countries touch each other less

Social Norms Can Get in the Way of Human Touch



Source: Mindline Research 2019

than people in Southern Europe and South America, where, for example, a hug and kiss on the cheek with people outside their own family are often considered an acceptable form of greeting. While social norms play an important role in keeping society functioning well, the data shows that they can be a factor in the amount of touch that people give and receive.

For many respondents, uncertainty about what type of touch is appropriate or whether the recipient would reciprocate prevents them from initiating touch. More than three-quarters of respondents reported that personal insecurities, such as being unsure if people would be comfortable receiving a hug, is a barrier. This figure is substantially higher – 85 percent – in China, India, and Thailand. Another 69 percent reported that they are open for touch, but they always wait for the other person to make the first move. These findings are especially pronounced in one group in particular: Men.

As many as 89 percent of men and 88 percent of women believe that human touch is key to living a happy, fulfilled life. Yet men face more personal insecurities around touch, with 76 percent of men indicating that they are often unsure how much physical contact is acceptable in society, compared to 71 percent of women. More men than women wish they could receive more hugs (73 percent compared to 70 percent). Furthermore, while they wish for more touch, they're actually experiencing less; 20 percent experienced no physical contact at all the day before the interview, compared to 14 percent of women.

Clearly, men long for more tactile connections in their everyday lives, but feel insecure about initiating and receiving physical touch. Men who place more emphasis on traditional gender roles or feel pressured by societal expectations may be less likely to engage in physical touch, fearing that it could be considered "feminine" or "soft." Many are afraid

⁵ <https://www.npr.org/sections/ed/2014/08/28/343735856/>

⁶ <https://www.weforum.org/agenda/2016/11/empathy-index-business/>

⁷ <https://www.advisory.com/daily-briefing/2016/09/27/millennials-not-focusing-on-health>

⁸ <https://www.pewsocialtrends.org/2015/12/17/2-satisfaction-time-and-support/>

to express their emotions or are unable to articulate their needs. Others are afraid their touch will be interpreted as a sexual advance, or that it will be rejected. Some fear being affectionate with their children⁹. A father in Germany told us, "I feel really uncomfortable when my 12-year-old daughter wants to sit on my lap in public. I don't want anyone to think that I am acting inappropriately!"

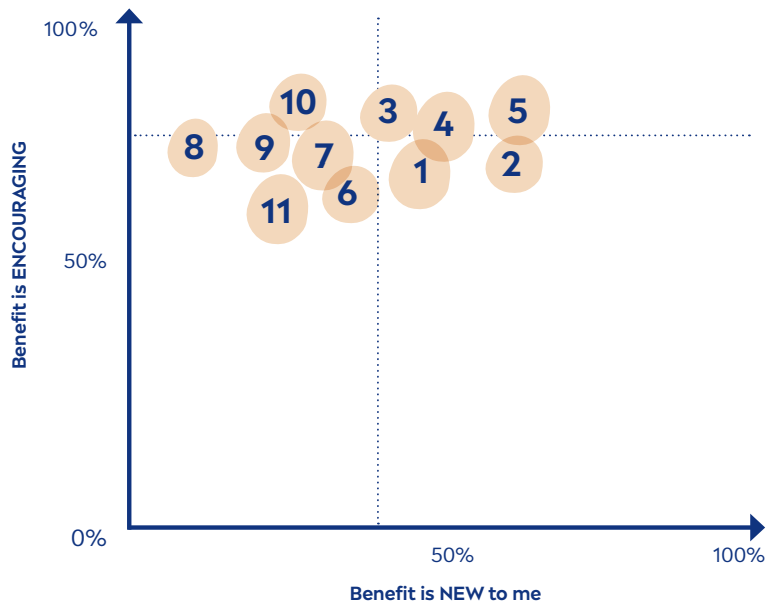
Clearly, men long for more tactile connections in their everyday lives, but feel insecure about initiating and receiving physical touch.

Regardless of the reason, the consequence of these insecurities means that with the exception of handshakes, men are more likely than women to forego a caring, platonic touch – and all the benefits that come with it.

The Knowledge Gap: People Lack Awareness of Physiological Benefits of Touch

Touch has a profound effect on our health, development, and relationships. Of all the human senses, it is the first to develop and very important. Present from as early as eight weeks of gestation, our ability to experience touch is the result of a sophisticated system of nerves, sensors, and receptors that connect our body's largest organ – the skin – to our brain, our environment, and the people around us. It has the power to instantaneously lower stress, increase oxytocin (the "feel-good" hormone), and help us connect to each other. Dr. Abraham Verghese, Professor of Medicine at Stanford University, emphasized these benefits when he said, "I'd like to introduce you to the most important innovation in medicine to come in the next ten years, and that is the power of the human hand – to touch, to comfort, to diagnose, and to bring about treatment." This statement underscores the consensus among scien-

New and Encouraging: Physical and Psychological Benefits of Touch



- Physical Benefits**
- 1 Reduces physical pain
- 2 Strengthens immune system
- 3 Calms heart rate and normalizes blood pressure
- 4 Increases chances of survival for premature babies
- 5 Reduces agitation in Alzheimer's patients
- Psychological Benefits**
- 6 Decreases the level of stress hormones
- 7 Increases the level of feel-good hormones
- 8 Reduces loneliness
- 9 Reduces symptoms of anxiety
- 10 Reduces symptoms of depression
- 11 Supports team spirit, e.g. in sports of working teams

Source: Mindline Research 2019

⁹ <https://www.psychologytoday.com/us/blog/hide-and-peek/201706/touch-hunger>



Joumana

When a newborn, infant, or their parent is upset or in pain, sometimes the best medicine is a hug. For Joumana, 36, a pediatrics nursing officer at the Medcare Women and Children Hospital in Dubai, professionalism always comes first, and this also means that every patient should be treated with respect, love, and a smile: "I find happiness through the smile of my patients. If everybody could have the power of understanding people's feelings and support them in their toughest moments, the world would be a better place."

MEDCARE WOMEN AND CHILDREN HOSPITAL, DUBAI, UNITED ARAB EMIRATES



Fernanda

"Teaching ballet to blind girls? At first, I thought this was impossible." Fernanda Bianchini, 39, a physiotherapist from São Paulo, founded a professional ballet company in Brazil based on a unique methodology that she created. The blind girls learn ballet guided by touch. Fernanda and Geyza, a blind teacher, lend their body to them, use their own sensitivity, and feel each other's energy. "When I meet someone, I like to feel the face of the person, their hair... For me, it's natural to feel people and give them the freedom to touch me."

tists about the physical and psychological benefits of touch. But are people outside the scientific and medical communities aware of these benefits?

While the psychological benefits tend to be well-known, the NIVEA study reveals a knowledge gap in most people's awareness of the physiological benefits of touch. When asked about their understanding of the physical benefits, including reduced physical pain, a stronger immune system, and lower blood pressure, many participants in the global study reported being unaware of them. More than a third of respondents did not know that physical touch decreases the level of stress hormones, and more than half did not know that touch strengthens the immune system. An overwhelming 86 percent of respondents find this information encouraging enough to include more physical touch in their daily lives – which raises the question: if people knew more about the benefits of touch, would they do more to initiate touch individually and collectively?

"So we could start by asking yourself every day: Did I have any connection with others? Was I present? Did I give my full attention to my mom, my friend, my child? Because remember – your touch, your smile, could create all the difference for them."

Our results suggest that the answer is yes. The findings clearly show demand for a more positive societal approach to the topic of human touch: 92 percent of respondents think that we need to talk more about the benefits of human touch, and 85 percent think it would be a good idea to have a movement that advocates the "good touch" in society – in other words, the ways in which touch can be used to express care, affection, friendship, etc. Such measures could help educate people on the benefits of touch, sort out the confusion on which types of touch are acceptable, and remind

people to incorporate more touch into their lives. A total of 85 percent think that schools should teach the importance of human touch. This overwhelming support for solutions to the lack of human touch is consistent in all countries and age groups measured.

The barriers to human touch aren't likely to disappear overnight, if ever. But some are more easily addressed than others, and awareness of our own actions is an important first step. While technology adoption shows no signs of slowing down, we can harness the power of technology to spread the message of the benefits of human touch, and to reach out to those who may be lonely and in need of connection. We can help those who may be overwhelmed by the demands of modern life to de-stress with a hug. We can take individual action to incorporate more touch into our lives, showing our appreciation, care, or love. And we can help alleviate personal insecurities in others by being the first to reach out and initiate caring touch.

Dr. Strauss of Sheba Medical Center offers this call to action: "So we could start by asking ourselves every day: Did I have any connection with others? Was I present? Did I give my full attention to my mom, my friend, my child? Because remember – your touch, your smile, could create all the difference for them." Like the rhesus monkeys in the wire mother experiment, we all need touch in order to feel secure and cared for, and to experience healthy development. Fortunately, unlike the monkeys, we don't need to rely on replacements for touch – whether it is our screens, our busy lifestyles, or our gendered notions about self-sufficiency. The solutions are right in front of us, waiting for the opportunity to connect. Let's give ourselves the gift of touch by incorporating more of it into our daily lives, and let's join forces to put the spotlight on the power of human touch.

Juarez and Heloisa

It was love at first sight when Juarez, 19, saw 22-year-old Heloisa in the main street of São João Del Rey 54 years ago. For the parents of five children, 18 grandchildren, and 13 great-grandchildren, touching each other and giving hugs and cuddles are a sign of love. Or comfort. Their own parents never held hands. "Juarez and I always liked to cuddle, to touch. I don't even call Juarez by his name. I call him Love. And now everyone else calls him Love, too."

Touch – How We Enter, Understand, and Respond to Our World

BY MARC H. BORNSTEIN *

You can close your eyes and try to imagine what it is like to be blind, or plug your ears and imagine what it is like to be deaf. But it is extremely difficult to imagine what it is like not to perceive touch. Our sense of touch is always “on” – transmitting through our skin a diverse array of sensations, a soft stroke on the arm, the sting of a bee, a cold burst of air, or an irritating itch. As one touch scientist mused, we cannot imagine life without a sense of touch because touch is woven so deeply into our sense of self.

What do we know about touch? Here we learn about the primacy of touch among the five senses, the formative information that touch conveys, how touch works and its biology, ways we understand the world through touch, and how touch shapes our emotional and social well-being, the personal and cultural meanings of touch, as well as the many practical and therapeutic uses of touch.

The Primacy of Touch in Development

Touch is the first sense to emerge in utero. As early as eight weeks after being conceived fetuses give evidence that they sense touch on their face, reacting to stimulation there, and by 14 weeks their whole bodies respond to touch. Still in the womb the fetus begins to accrue sensory experiences through touch, feeling the warmth and movement of amniotic fluid and the contours of their own bodies, which they ac-

tively explore. Fetuses even respond to touch from outside the womb. Between 21 and 33 weeks after conception, fetuses have been observed moving their arms, head, and mouth in response to mothers rubbing their abdomens. Immediately at birth, newborns use their sensitivity to touch around the mouth to root and nurse on breast or bottle, and physical contact with their caregivers introduces newborns to the existence of the world outside themselves. While human newborns do not need to cling to their caregivers like other primates do, tightly grasping a finger placed in their hand is a universal neonatal reflex.



Touch and the Other Senses Work Together

Our five senses – sight, hearing, smell, taste, and touch – are our gateway to the world: to be meaningful, everything must first be sensed and perceived, and the senses naturally work to-

gether to help us comprehend and appreciate our environment. For example, we rely on sight and taste to decide if a food is safe to eat, sound and sight to ascertain if a disturbance in the woods is benign or threatening, and touch and sight to determine how to grip and lift an object. Stimulation of our senses fuels our biological, cognitive, social, and emotional development. However, a person can be blind or deaf or lack the senses of taste or smell and still lead a full productive life. But what if we are deprived of touch? Although it is difficult to separate the contribution of any one sense to what we perceive, this article explores the many unique contributions of touch to our developing, understanding, and relating to others.

Touch Is Information

Touch conveys a wealth of information about the world, and we need touch to navigate our way around our environment. In *De Anima*, the Greek philosopher Aristotle eons ago expressly linked tactile perception with practical intelligence; in English, to “grasp” a meaning is to understand. Through touch, we localize when and where on our skin an object makes contact and what its many different properties are – whether the object is hard or soft, rough or smooth, heavy or light, hot or cold. We even discriminate subtle differences in types of touch – a pat, a hug, a pinch, a stroke, or a tickle to name but a few. Touch conveys pain as well as pleasure, and touch is a means of communicating emotion: a gentle caress or an abrupt push inform us immediately how our partner feels. Indeed, even newborns use touch to glean information about salient properties of objects, such as their texture, weight, and temperature.

We sense touch primarily through our skin, the largest organ of the body, and the body’s stoutest shield and protector. Skin shuts out dangerous substances, such as pathogens, while keeping in vital body fluids. Our skin helps us maintain normal body temperature, and miraculously heals itself when damaged.

More Than Skin Deep: How Touch Works

The top layer of skin is called the epidermis, and just below, in the dermis, is where most touch receptors (nerve endings) are located. Touch receptors transmit tactile sensations on the skin to the brain. Not all regions of skin on the body are equally sensitive to touch. Fingertips, lips, and tongue are more sensitive than stomachs and backs: for example, we can tell the difference between two pinpricks that are only 2 mm apart on our fingertips but cannot distinguish one from two on our lower backs unless they are 30–40 mm apart. This differential sensitivity reflects the greater concentration of touch receptors on the fingertips than on the lower back, and the number and distribution of touch receptors mean that more sensitive regions of skin are represented in greater magnitude in the parts of the brain that process touch (primarily the somatosensory cortex). Notably, tactile experience affects how parts of the body are represented in the brain. For example, playing certain string instruments, like the violin, that require continuous left-hand fingering (as the right hand holds the bow) results in greater representations of the left-hand fingers in the somatosensory cortex. Albert Einstein played the violin from a young age, and an autopsy of Einstein’s brain showed this.

Besides their number and distribution, touch receptors also come in a variety of types which signal different tactile sensations. Some receptors are specific for mechanical stimulation (like pressure, vibration, and texture), others for temperature, for pain, and even for gentle caress (which as you can imagine plays a special role in our emotional well-being). Touch receptors tell us about objects we are exploring (called active or haptic touch), for example that a peach is soft so it must be ripe, just as they tell us that we are being touched (called passive touch), for example that someone is tapping our shoulder or that our sweater is scratchy. Temperature receptors help us regulate our body temperature and warn us about things that are so hot or so cold that they may harm us. Similarly, pain receptors alert us

* References see pages 42/43

about dangers to the body's integrity and propel us to take appropriate action, for example to find and remove a painful splinter. Still other touch receptors reside in our muscles, joints, and tendons. These receptors convey information about our movements and body position (called kinesthetic perception). Some touch receptors carry messages to the brain only slowly, and others swiftly (that flame that touched our skin), some persist in signaling their sensations, and others adapt and stop signaling (we are hardly aware of the clothes continuously touching our body). Taken together, touch receptors allow us to perceive many different sensations.

Touch Is Rooted in Our Biology

A lot of what we know about the biology of human touch surprisingly comes from studies of "touch deprivation" in rats and monkeys, and in children who have been reared in compromised situations – premature babies in incubators and children living in institutions. The animal studies have been especially revealing.

Many young animals separated from their mothers show significant developmental delays and behavioral abnormalities, but what exactly about the absence of maternal care causes those untoward effects? To find answers to this question, in the 1980s scientists first isolated newborn rat pups from their mothers and documented the expected developmental delays. These delays were accompanied by marked changes in the pups' biochemistry, notably suppression of growth hormone release and protein synthesis.

The missing active ingredient turned out to be the tactile stimulation derived from mothers' normal licking and grooming of their pups.

The question then arose, what type of stimulation would return these growth parameters to normal? Controlling pups' body temperature, feeding, and auditory, visual, and olfactory stimulation made no difference in their growth. Deprived pups could even be returned to their litter mates and to their mothers, who had been anesthetized to prevent maternal stimulation but not feeding, and the pups' growth did not return to normal. The missing active ingredient turned out to be the tactile stimulation derived from mothers' normal licking and grooming of their pups. When the researchers simulated those tactile sensations by stroking the pups with a wet paintbrush at the pressure and frequency of their mothers' licking and grooming, the growth hormone production and protein synthesis of the pups returned to normal. Loss of tactile stimulation from their mother on the pups' physiology is long-lasting: pups whose mothers licked and groomed them frequently at birth responded more adaptively to stress as adult rats than pups of low licking and grooming mothers.

These animal studies informed our understanding about the role of touch in human development. Two situations provide "natural experiments" of what happens to human infants when deprived of touch. One is prematurity and isolation in neonatal intensive care units (NICUs), and the other is orphanage rearing. A study in the 1960s suggested that institutionalized babies provided with just 20 minutes of extra tactile stimulation per day fared significantly better on developmental assessments after ten weeks. In the late 1980s, however, the world's attention was drawn to the plight of Romanian orphans who were living in stark institutional environments deprived of normal human and environmental stimulation.

These orphans showed shocking delays in long-term growth and poor socio-emotional development. Of course, they lacked many types of stimulation, but, because of orphanage understaffing, lack of tactile stimulation – human touch – was a prominent deprivation in these unfortunates' lives.

Very premature babies can spend their first

weeks (or even months) in incubators and so do not experience a normal range of sensory stimulation including touch. With advances in medical treatment, survival rates for these infants have greatly improved. However, a continuing challenge has been to ensure that preterms grow and develop normally, as many suffer significant developmental deficits.

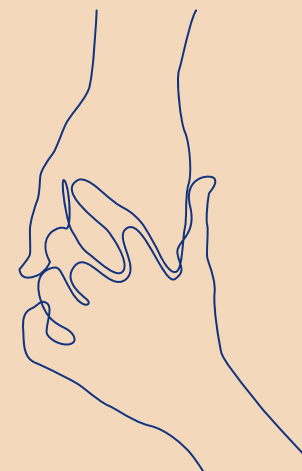
A number of studies have examined the effects of supplemental stimulation on the development of preterm babies. Not surprisingly, because of the relative salience of the different senses early in development (when sight and hearing are not so well developed as touch), tactile stimulation is particularly effective in improving developmental outcomes.

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Following the studies of tactile stimulation of rat pups, researchers have explored whether touch, in the form of massage, combined with moving babies' limbs, could improve outcomes for preterm babies. Indeed, preterm babies who receive supplemental tactile stimulation gain more weight than those who do not, are more active, show better performance on standardized assessments of development (including orienting, motor behavior, and regulation of state), and on average fewer days in hospital. These benefits remain even accounting for other stimulation, food intake, and infants' medical status. Moreover, the effects of massage persist: when tested after eight and 12 months, massaged infants weigh more and score better on mental and motor assessments.

Similar salutary effects of touch on development have been found with typically developing

babies. The "still face" is a psychological paradigm where a mother first interacts normally with her infant but then adopts a nonresponsive stance, remaining still and ceasing to interact. In this way, the still face simulates maternal deprivation by making the mother temporarily socially unavailable to the child. Normally, babies as young as two months of age become upset during the still face. Infants will display negative physiological (hormonal and cardiac) and behavioral (withdrawal, gaze aversion, self-soothing, and negative arousal) responses. However, when mothers maintain a still face but continue to touch their infants, the infants cry less, display less negative arousal and self-soothing behavior, and, notably, their negative physiological reactions are reduced.



Together, these deprivation and experimental studies demonstrate the power of touch in regulating biology and behavior. What is more, numerous other studies have cataloged the many beneficial effects of touch on babies' stress responses, arousal, heart rate, blood pressure, immune system, and more. Nearly all around the world, parents swaddle infants as an effective means to soothe them, decrease stress, reduce heart rate, and induce better quality sleep. Touch exerts similar soothing effects on adults. Physical contact, such as holding hands, hugging, or massage with a romantic partner, before a stressful situation (e.g. public speaking) lowers

blood pressure, heart rate, and stress hormone levels. Volunteer “grandparents” who both received massages themselves and gave massages to infants experience less anxiety and depression, enjoy better sleep, and benefit from lower levels of stress hormones. Touch has many practical and therapeutic functions that will be discussed below.

Touch Affects How We Understand the World

Touch plays a crucial role in apprehending the world around us. Infants first explore using sensitive touch receptors in their mouths and on their tongues. Newborns readily turn their heads reliably toward a touch to the side of their mouth or their cheek and over the next several months eagerly explore their hands and feet, clothes and blanket, with their mouths. Everyone has noticed how babies invariably bring objects in their hands to their mouths to discover their features. This hand-to-mouth coordination has even been observed in utero, such as when fetuses suck their thumbs. Newborns can already discriminate some properties of objects by touch, such as texture and weight, and by three to four months infants palpate objects in ways that conform to the object’s features, for example by scratching a textured toy but not a soft toy. Actively manipulating an object conveys much information about the object’s properties that static contact just does not deliver.

Touch even informs how best we should grasp an object.

To investigate the world adults usually use all available senses, but everyone has had occasion to use active touch instinctively to search “blindly” in a pocket for keys or, hands forward, find our way in the dark relying exclusively on touch.

Adults deploy several different tactile exploratory techniques, primarily when vision is un-

available, and each is geared to obtaining a particular type of information: running a hand along the surface of an object to determine its texture; squeezing an object to determine its hardness or compliance; moving a finger along an object’s edge to determine its contour; grasping an object to determine its shape and volume; laying a hand on an object to determine its temperature; and holding an object to determine its weight. Touch even informs how best we should grasp an object. Reflect for a moment on the last time you adjusted a tool in your hand to best accomplish a job. People with nerve damage in their hands frequently drop things because they lack touch receptor feedback to the brain necessary to fix their grip. As people age, their density of touch receptors and so their tactile sensitivity declines, often making them clumsier.

Touch Shapes Our Emotional and Social Well-Being

Just being touched affects how we feel. A pat on the back can make us feel relaxed and happy, but a jab in the arm can make us feel agitated and angry. Touch also affects how we feel about others. Among babies’ first social experiences is the loving touch of a caregiver. Such touches foster a sense of security and trust in the infant and a connection between infant and caregiver. “Attachment” is the term widely used to refer to the special bond formed between infants and their primary caregivers. The ethologist John Bowlby theorized that this unique bond evolved to ensure infant survival by keeping mother and helpless babe in close physical contact.

Psychologist Harry Harlow’s groundbreaking experiments with infant rhesus monkeys confirmed the importance of “contact comfort” in normal social and emotional development. Infant monkeys raised with access only to wire “surrogate” mothers, one of which was covered with terry cloth and one of which provided life-sustaining milk, spent most of their time clinging to the terry cloth mother, and only briefly visited the wire mother to nurse. Later, only the cloth mother was a source of comfort, and the monkeys used the

cloth mother as a safe base to explore their environment.

Social grooming among our primate relatives (macaques and chimpanzees) brings the animals into close physical contact and occupies a significant portion of their day, maybe second only to foraging and feeding. Such touching serves several purposes: it defines and solidifies social relationships (e.g. between mother and offspring, close kin, dominant and subordinate adults, and sexual partners); it facilitates forging new relationships (e.g. chimps are more likely to share food with chimps who groomed them earlier in the day); and it assists in conflict resolution and reduction of aggression.

The socio-emotional significance of touch lasts lifelong, and researchers now refer to the skin as a “social organ.” Neuroscientists have discovered that social functions of touch are actually part of our neural wiring. For example, some mechanical skin receptors are excited specifically by stroking at a pressure and speed resembling a gentle caress, and when stimulated in that fashion generate a pleasant sensation. These receptors communicate in turn, not with the sensorimotor part of the brain, which is the terminal for other mechanical receptors, but with parts of the brain that process emotional and social information.

The pleasant sensation that comes from skin-to-skin contact promotes affiliative behavior between people that facilitates sociality. When Romeo sees Juliet for the first time, he muses to himself:

“See how she leans her cheek upon her hand. / O, that I were a glove upon that hand / that I might touch that cheek!”

Touch is vital to trust, cooperation, and group function. For example, brief celebratory touches, such as chest bumps and hand slaps, enhance

individual and group performance in professional basketball players, and do so by reinforcing cooperation. Gentle touches affect social relationships in ways we are not always even conscious of. People are likely to give bigger tips, return money left behind, rate a store more highly, and even spend more money if just gently touched in the course of a transaction. The slow stroking of a romantic partner, at the pressure and speed that triggers a pleasure response, can even reduce the subjective feeling of pain. Evolutionary scientists have concluded that the affective function of touch is an adaptation evolved to promote positive physical contact, such as nurturing and supportive social interaction, and so is critical to positive lifelong social relationships.

Touch communicates a wide variety of emotions – from love to anger – without any other cues and does so just as reliably as do faces or voices. In English, such common expressions as something is “touching” or being “touched” by someone or something is a direct expression of emotion.



Personal and Cultural Meanings of Touch

Not all touches are equal. The meaning of a touch is surprisingly complex, reflecting many factors, such as the characteristics of the touch and our personal history, status, and culture. Mechanical touch has different physical properties that result in different sensations and perceptions: the

intensity of the touch (a tap versus a poke), the frequency of the touch (one pat on the back versus repeated patting), the duration of the touch (a quick hug versus prolonged contact), and where on the body the touch occurs (a pinch on the cheek versus a pinch on the behind) all influence whether the touch “feels” pleasant, annoying, or painful, as well as whether the touch signals affection or aggression.

Who touches whom and how conveys information about the individual, such as their gender and status within a society. A hug from a friend may feel pleasant, but a hug from a stranger or a boss may feel intrusive. In the West, men tend to touch women more than women touch men, and older people tend to touch younger people more than vice versa. Touches reflect status differences between groups as well gender and age mores.

“Sometimes, reaching out and taking someone’s hand is the beginning of a journey.”

How people around the world greet one another regularly involves ritualized touching. The British-American anthropologist Ashley Montagu listed a fantastic array of touch-related greeting behaviors from around the globe that included kissing (once, twice, or multiple times), nose rubbing, cheek rubbing, back slapping, hand shaking, placing the hand over the heart, head bumping, and more. Fist bumping is both a greeting and a shared celebration common today. As one philosopher observed, “Sometimes, reaching out and taking someone’s hand is the beginning of a journey.”

The socio-emotional meaning of a touch deeply reflects one’s culture. Different cultures follow different rules about what is appropriate and acceptable touch versus what is taboo. Shaking hands with someone of the opposite sex may be warmly welcomed in one culture but might be considered unpleasant, unwelcome,

and offensive by someone from a culture where members of the opposite sex are prohibited from touching. The frequency that people touch each other varies across cultures and relates to other cultural customs. For example, mothers in Cameroon, where interdependence in social relationships is the norm, maintained body contact with their infants during periods of free play significantly longer than mothers in Greece, where the focus in development is on fostering interpersonal independence. Not surprisingly, some authorities have claimed that societies in which people touch each other often are more peaceful than societies characterized by little mutual touching. Clearly, what our culture teaches us about acceptable and unacceptable behavior factors in whether we touch, whom we touch, and how we interpret touching and being touched.

Practical and Therapeutic Uses of Touch

Because it is so pervasive in life and so powerful a conveyance of information and emotion, touch has an enormous variety of uses in society. As a means to allow the blind to read, Braille was developed as a system of raised dots on a page that are separated by distances that can be perceived using the pad of a finger. Machines have been designed to take advantage of tactile capabilities to help the disabled. For example, touch sensors allow the deaf/blind to operate computers, smartphones, and elevators.

Touch’s therapeutic uses date back millennia, and the restorative goodness of touch finds many applications today. A notable example is “kangaroo care” (named because it resembles how kangaroos carry their young), where infants clothed only in diapers are held against the bare chest of a caregiver. Kangaroo care started in Bogota, Colombia, in the 1970s to address high infection and mortality rates in hospitals due to crowding and scarcity of incubators. Mothers were encouraged to hold their babies in skin-to-skin contact for extended periods and while breastfeeding. Morbidity and mortality among the infants rapidly declined. In the years since, many

studies of kangaroo care have validated its numerous, substantial, and long-lasting benefits for babies and families. In low- and middle-income countries, kangaroo care has been found to reduce mortality, infections and severity of infections, and length of hospital stays, and to improve mother–infant bonding, breastfeeding, and maternal satisfaction. In high-income countries, where mortality and illness are not so great risk factors, kangaroo care has been found to promote mother–infant bonding and breastfeeding. Among its reported benefits are cardiorespiratory and temperature stability, better sleep organization, improved performance on behavioral assessments, reduced adverse responses to painful procedures, and improved family environment.

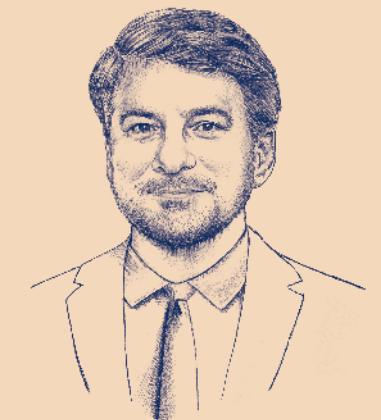


Little wonder that kangaroo care and other forms of skin-to-skin contact have become accepted parts of newborn care in many hospitals. Of course, skin-to-skin tactile stimulation is not the only sensation kangaroo care affords, but it is certainly a significant component.

Still other well-recognized medical applications of touch include massage therapy, whose benefits (in addition to those already discussed for preterm babies) are multiple – reduction of blood pressure, anxiety, heart rate, depressive symptoms, even persistent lower back pain, to name just a few. Hippocrates, the father of medicine, has been attributed as saying “anyone wishing to study medicine must master the art of massage.”

Touching and Being Touched

Touch is where science meets civilization. Through the natural and medical sciences, we have come to understand much more deeply the mechanisms of action and biochemical, biological, and neurological impacts of touch. Through the social and behavioral sciences, we have come to appreciate the meaning and functions of everyday experiences of touch. Touching and being touched are so common we readily take them for granted and may hardly think about them ... except, of course, when they thrill us or when a line is crossed. Some touches are decidedly not positive. Unwanted touches, slaps, or hits are deeply problematic and have long-term untoward consequences for children and adults alike. Solitary confinement, being “out of touch” with other people, is mentally damaging. As we have now learned, however, many touches are welcome, longed-for, and essential in life. As William Shakespeare wrote in his play *Troilus and Cressida*: “One touch of nature makes the whole world kin.”



Marc H. Bornstein is one of the leading experts in the field of child and youth development, and in this capacity has also researched the effects of touch on human development extensively. He holds a BA from Columbia College, MS and PhD degrees from Yale University, and honorary doctorates from the University of Padua and University of Trento. He has been published widely in experimental, methodological, comparative, developmental, and cultural science as well as neuroscience, pediatrics, and aesthetics.

Human Touch Is Food for a Baby

20 years ago, Mary Gordon established “Roots of Empathy,” a Toronto-based in-school program that seeks to foster positive social behavior and prevent aggression or bullying among students. We asked her about the program and the impact of human touch.



Mary Gordon, Founder and President of “Roots of Empathy” in Toronto

Mary Gordon is an internationally recognized, award-winning social entrepreneur, educator, and author who has created programs informing the power of empathy. Mary’s mission is to build caring, peaceful, and civil societies through the development of empathy in children and adults. Her book **Roots of Empathy: Changing the World Child by Child** is available in multiple languages.

Mary, the core idea of the program is that parents bring their baby to an elementary school class, where the children get to read the baby’s emotions. What role does touch play in the interaction with the children and the baby in the classroom?

Touch plays a pivotal role in the “Roots of Empathy” classroom – initially, through the attachment and relationship or the loving relationship between the parent and the baby. We explain to the children that babies can’t communicate with words – they communicate with touch, with sound, with body language. And the children come to understand how crucial touch is for a baby to thrive – that babies who aren’t cuddled and rocked and patted are babies who are constantly hungry for human connection. Human touch is actually food for a baby! And the children realize that the secure or the happy relationship between the parent and the baby is most readily realized through touch, and that parents talk to babies as they touch them. Touch is the language of connection, and with little children in the classroom it’s also important that they touch the baby. So, when they sing to the

baby in the circle around the green blanket, the children touch the baby’s toes or the baby’s feet and legs – every child has a chance to touch the baby. Touch is the first human connection. And what we know from the scientists is that this touch increases the hormone oxytocin, and that the children feel happier and more relaxed and they feel a sense of solidarity.

The existence of a program like “Roots of Empathy” very likely points to the problem that a significant portion of children may not have the chance to grow up in a social context of empathy and “positive touch.” How do you secure the integrity of touch for the baby, the mother, the father, the teacher, the students in your program?

It is very important that we do things that empower children to appreciate respect for their own bodies and respect the distance of the others, and here’s an example of how we do it. We ask the little baby if we might pick them up, and then the instructor asks the little children: “What do you think the baby is telling me?” The children have to read the baby’s cues to understand if the baby is saying “yes” or

“no.” And – very often – we set this up on purpose and then the instructor says: “Well, you’re telling me that the baby is saying ‘no’ – in that case, I won’t pick the baby up. Let’s see what happens when mommy or daddy asks the baby!” – and, of course, then the baby is enthusiastic, and the children see the huge difference in the response from the baby. We all have a right to say “yes” or “no” – that’s all we’re saying.

Overall, what role do you think touch has for the development of the children? You talked about the babies, but how is it for the children that you experience in your classroom?

In terms of children’s brain development and their emotional development, we feel our connections to feeling loved, safe, and secure are generally delivered by touch. If you go back to very early childhood, we remember cuddles, being rocked, being carried. When a child is well-loved, their hands are held, they are hugged, they have a sense of family, sitting all together, and there is a sense of connection to touch. If you think about the primacy of touch in infancy above all the other senses, touch is paramount in our ability to thrive. With her research on premature infants, Tiffany Field (a professor of pediatrics, psychology, and psychiatry at the University of Miami School of Medicine and director of the Touch Research Institute) was able to experience phenomenal developmental growth and weight gain in infants, simply by making sure a loving hand came through the incubator and stroked the little baby. I think touch transcends age, generation, culture, and language. It is a universal language, and I deeply believe that touch is the most human connection that we can have.

As there must be many moving stories of touch out of the “Roots of Empathy” classroom, do you have a favorite one that you want to share?

Going way back, probably 1998 or ‘99, there was this little fellow in a second-grade class. He was in foster care and a very aggressive little child. They had had “Roots of Empathy” classes the year before and the teacher called me up and said: “Mary, I am so disappointed, but I can’t have ‘Roots of Empathy’ this year, because I have a very violent little boy who bites, spits, and kicks for no reason. I don’t feel I could be responsible for the safety of a baby in the classroom.” So I spoke to the mother, who we already had in place. I told her that the classroom teacher was worried about the safety of her baby. She asked me if all the children would miss the chance to have the program, because of this one child. Despite all my concerns about the safety of her baby, she replied: “Don’t worry, I’ll bring my husband. He will sit one side of me and the baby and the instructor will be on the other side.” On the third visit, the mother invited this little boy to sit right next to her and the baby. And this little boy had never smiled, right? The baby flipped his leg over onto the leg of the little boy, who had come back from gym class. All the kids were in their shorts and the little baby’s skin touched his skin. And then he turned to the baby and gave his very-first smile. The classroom teacher said that it was the power of that touch, of that little leg on his leg, that did it. I mean, maybe it’s not the power of touch, but everybody seemed to think that it was. I think it was. And it was the little boy’s breakthrough.

None of Us Is Robinson Crusoe



Richard M. Lerner, Professor of Child Study and Human Development

Richard M. Lerner is professor at Tufts University, occupying the Bergstrom Chair in Applied Developmental Science and director of the Institute for Applied Research in Youth Development. Lerner has authored more than 700 scholarly publications, including more than 80 authored or edited books, and was founding editor of the *Journal of Research on Adolescence* and of *Applied Developmental Science*.

Richard M. Lerner has researched how young individuals develop a healthy and productive personality. We talked to him about his “5 Cs of Positive Youth Development” and the role of human touch.

In a recent NIVEA survey, the findings were that 20 percent of all male respondents had not had any physical contact the day before the interview. So, what about you? Did you have a hug?

Well, it depends what you mean by physical contact. Regarding my typical day: I meet people, shake their hands. If I know them, I hug them – so, of course, I have physical contact with people on a daily basis!

In your capacity as an expert for applied youth development, what does successful growing up mean to you?

You need the attributes that allow you to not only thrive personally, but to thrive in relation to others. Simply put, none of us is Robinson Crusoe and our daily environment is anything but an island. We need to develop the ability to live with other people and get along with them. This type of thriving allows you to enact your interests, goals, aspirations, and efforts. So, positive youth development (PYD) means becoming an individual who understands the intimate connections between self and others, to his or her social environment. Such a person strives to make a positive difference for self, family, community, and civil society. I am certain you know that I have a specific model of that, which involves the “5 Cs of Positive Youth

Development,” comprising “Confidence,” “Character,” “Contribution,” “Competence,” and “Connection.” These are outcomes which need to be fostered in order for young individuals to develop a healthy and productive personality in adult life. If this development turns out to be successful, you end up being a person who contributes in the ways that I have just mentioned. Of course, other scholars don’t need to adhere to the Lerner and Lerner “5 Cs Model.” For example, my colleague Bill Damon at Stanford University talks about “positive” or even “noble” purpose in order to define the attributes of a successful person. However, in all instances, PYD involves mutually beneficial relations between a person and his or her world.

Why is touch essential for human development when you think about successful growing up, and also overall human development? Does that actually influence us as young people?

Physical contact between our own bodies and the bodies of other people is probably the fundamental facet of human development. Nobody comes into being without this kind of physical connection to another human being. Therefore any human life begins with the baby touching his or her mother. So touch, propinquity, and physical contact with another human being represent the foundation for

any human life. In fact, all life involves a social relationship with another member of one species – termed “a conspecific” in evolutionary biology and comparative psychology. Now, if an individual is isolated and not able to touch another, we know that that is a situation creating maladaptive human development.

In your own research, did touch ever become an important indicator or signifier, or did it ever become an issue in your research on youth development that you had to focus on?

The work that Jackie Lerner – my wife – and I did with the “New York Longitudinal Study” may be relevant here. Together, we took over a longitudinal study (a study that is conducted over a period of many years) of 133 children, who were born between 1956 and 1962. This was a study that originated from the work of the psychiatrists Alexander Thomas and Stella Chess. We had a data set without any gaps from the first weeks of life all the way to young adulthood. We were able to see differences in the interaction between mother and child, and because these were children of the 1950s and early 1960s, mothers were doing most of the caregiving. About 60 percent of the mothers back then worked outside of the home and had high levels of academic attainment. What we saw was that issues of mother–child separation in the early weeks of life, due to the fact that so many mothers worked outside of the home, meant that the mothers varied in amounts of separation, touch, and provision of contact, as well as comfort – to use the words of the scientist Harry Harlow. This variation had important effects for both the children and, in some cases, the mother.

Would you nevertheless also say that touch and hugging is important also for

an adult and also for their feelings of happiness and so forth?

In the study of epigenetics (a branch of research in biochemistry focusing on environmental factors changing the temporary activity of human genes), for instance, the research conducted by Steve Cole (a professor of medicine and psychiatry and biobehavioral sciences at the University of California, Los Angeles, UCLA) finds that when people feel lonely, changes may occur in their genes. Feelings of loneliness create high levels of the stress hormone cortisol. Loneliness, then, can change the whole epigenetic pattern of people. So the absence of intimacy is a huge problem in human development and can be a potential problem across the life span!

What is your personal story of touch that stays with you until today? Is there anything that you remember very fondly and that you want to share?

Before I knew my wife, I was dating another woman. We went up to visit my family in the Catskill Mountains area of New York State. This young woman and I went to the Delaware River to take a walk. I decided to wade into the river and some of the rocks were slippery. As I waded through the river, I slipped on one of the rocks. And next to that rock was a deep hole and I went down that hole, feet first. I was trying to get out, and as a last gasp effort, I managed to raise my right hand. A second later, I felt someone grasp me, pull me up, and get my head above the water. It was the young woman! She had been several yards further down, and hadn’t seen me come out again. So, feeling another hand touching me, I knew that I wouldn’t die. That was obviously a deep and important experience.

"Screen Time: 'Virtual Autism' Is Reversible"



Baroness Susan Greenfield, CBE, FRCP (Hon)
Baroness Greenfield, Founder and CEO of Neuro-Bio Ltd, is a neuroscientist, writer, and broadcaster. She holds 32 honorary degrees from UK and foreign universities and has published over 200 papers in peer-reviewed journals, based mainly at Oxford University but also at the College de France Paris, NYU Medical Center New York, and Melbourne University.

Neuroscientist Susan Greenfield's latest book "Mind Change" reveals how digital technologies are leaving their mark on our brains. We talked to her about physical touch, neurochemistry, and the mental development of our kids.

Why do you deem human physical touch to be important, and what exactly does it do to the neurochemistry of our human brains – especially in early days of life?

We know that physical touch leads to the release of endorphins. These are naturally occurring opiates in the brain. We know from the very early days, when you're being cuddled by your mother, that physical touch leads to a sense of well-being through the naturally occurring opiates in the brain and there have been various studies about that. The interesting thing that I found is that the mouth and the hands are the most sensitive to touch. If you look at a "map" of how your body is represented in your brain in terms of your skin and your touch, the hands and the mouth have – by far – the biggest allocation of territory in the brain. When you think about it, they are the most sensitive. And, of course, that's what you kiss with, that's what you eat with, and your hands are the most sensitive things. That, I think, also happens with babies in the womb, where they are sucking their fingers and their thumbs and they are actually stimulating them, so that they are the most actively represented objects in the brain.

What role does human touch play within today's societal life and our daily human interaction?

I think it's hugely important, when you think that – nowadays – especially young people, instead of being in the same room and actually interacting in a physical way, they communicate through screens. And I think this is a real issue! It's something that we should be very concerned about. When you first meet someone, touch is really important: you'll shake someone's hand, you might pat them on the back or on the upper arm. Where you touch someone, how you touch them, the duration that the touch lasts, these are all linked very closely to the degree of intimacy you have with the person – that type of relationship is such a powerful form of communication! I remember when my father sadly died in 2011, someone just put his or her arm around me without saying anything, and that meant more, and helped me much more than a thousand words ever could have done. And I am sure we've all been in situations where your natural tendency is – if someone's upset – to put your arms around them. It's not to speak to them, but rather to cuddle them.

What does the issue of lacking physical interaction due to the increasing use of and communication through technical devices have, especially on the mental development of kids?

Of course, one of the big questions, specifically about how screen technology is impacting children, is their ability to empathize. Over the last few years a new term has crept into use, which is "virtual autism." What people are saying is: if you do not rehearse interpersonal skills, you're not going to be very good at them, because you're only good at what you rehearse. And it will be aversive if you don't practice looking someone in the eye and smiling at them and cuddling them. You will increasingly resort to contact through the screen. However, "virtual autism" is different from autism: it possesses autistic-like traits of having difficulty in empathizing with others. And the very good news is: it can be reversed! There's a very good paper on this, where they took pre-teens – kids about 11 or 12, none of whom were good at empathy and with very poor interpersonal skills – and they divided them into two: half of them kept their digital devices; the other half had these devices confiscated, and they went to a summer camp for five days. Just within these five days, they could see a significant improvement in their interpersonal skills. That shows you that nothing is irreversible. The brain is constantly evolving and changing. So while one could fear that kids are going to have problems with empathy, if we do something about it, and if we give them an environment where they can rehearse face-to-face communication, then that should offset it.

Knowing that these technologies won't go away, but will become increasingly present in our and our children's lives, how can we address that issue?

The worst thing in life is to tell someone not to do something. A thousand years ago, I was a smoker. And the worst thing was people telling me not to smoke, because they didn't substitute it with anything else. And it was only when I read a book that said "Imagine having white teeth, and imagine being able to smell flowers and having a lot more money – it's a very positive thing!" that I was able to stop. So, if you want to reduce screen time, you have to introduce something that is more compelling, more exciting, more fun. A father who wrote to me from Melbourne had exactly that same problem with his kids. Eventually, he took them on a bike ride. And he said, as they were on the bike ride, they started giggling spontaneously. He said: "That is music to the ears of a parent. I never hear that when they're using technology!" I know that it's tough for parents nowadays, because the kids have a lot of demands. But you have to develop experiences and events for them that are more fulfilling and exciting than just staring at a screen. One of the most exciting things is to have a strong sense of who you are and a strong sense of identity and making things up. And remember when we were all kids saying: "Let's make up a game!" Now it's all about restoring that. It's about giving them the box rather than the present in the box. And, I think, that inner world – if you can help children develop that inner world and that inner imagination, that is way more exciting than just shooting things or interacting with the screen or some secondhand imagination.

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**Global Report: The State of Human Touch –
Benefits, Barriers, and Solutions**

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"In the 21st century children are growing up in a completely new world. We've never been so connected before through technology, but we are starved for human touch. Children have not changed. They still have the same emotional needs."

MARY GORDON
FOUNDER OF "ROOTS OF EMPATHY" AND
EXPERT IN THE FIELD OF CHILDREN
AND YOUTH DEVELOPMENT