



The Effects of Minority Stress and Social Acceptance on Brain Function in LGBTQ+ Individuals

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Abstract

This paper examines the link between psychology and neuroscience by investigating the influence of minority stress and social acceptance on the well-being of the neurological functioning among the LGBTQ+ population. Specifically, it reviews the psychological pathways related to chronic stress, such as activation of the HPA-axis, release of cortisol, and alterations of the brain structures related to emotional regulation, memory, and decision making. Moreover, it will discuss the psychological aspects of stress due to discrimination and stigma, as well as the role of family acceptance and social rejection. This paper will analyze the current research of psychology, neuroscience, and neuroimaging in order to investigate how social experiences can shape the brain through the development of neuroplasticity and mental well being of a person.

Introduction

Over the past several decades, the visibility of the LGBTQ+ community in America has grown as more people have come out with their different sexual orientations and genders. The LGBTQ+ community stands for lesbian, gay, bisexual, transgender, queer, and others. Although the identity of someone being part of this group is not necessarily a reason for mental health problems, there is a greater amount of psychological distress among this community when compared to the average person. The differences arise due to discrimination, stigma, rejection, bullying, and hiding their identity (Meyer, 2003). The effects of these experiences extend far beyond normal psychological well being. Repeated exposure to social stress activates the stress-response systems in the body, which include the autonomic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis (Ulrich-Lai & Herman, 2009). Activation of these stress-response systems can affect the levels of cortisol as well as brain structures that regulate emotions, memory, and decision making. On the other hand, positive experiences such as family acceptance, social support, and community belonging may decrease stress. Given that social experience can have an effect on both psychological and biological processes, to understand the health of the LGBTQ+ community, it is essential to be aware of both psychology and neuroscience. This paper will focus on how minority stress and social acceptance affect the nervous system, the stress response, the workings of the brain, and the general psychological well-being of the LGBTQ+ community. Through the exploration of the fields of psychology, neuroscience, and neuroimaging, this paper aims to explain how social experience can impact the brain.

The Nervous System

The nervous system is a complex biological communication network that allows the body to detect stimuli, process information, and give appropriate responses. The nervous system is

divided into the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS consists of the brain and the spinal cord which is the main processing pathway for incoming sensory information and outgoing responses, while the PNS consists of nerves that connect the CNS to organs and muscles throughout the body. They communicate information with the CNS and the rest of the body.

The main cells involved are neurons and glial cells. Neurons communicate using electrical impulses as well as chemicals known as neurotransmitters. Communication between different regions of the body and brain is possible because of neurons (Purves et al., 2001). It also ensures regulation of activities such as emotions, memory, and learning. Glial cells help the neurons function properly by ensuring that there is an environment that supports neural activity (Jäkel & Dimou, 2017).

The main part of the PNS is the autonomic nervous system (ANS), which controls automatic functions such as heart rate, breathing, and hormone release (McCorry, 2007). The ANS has two types of nervous systems: the sympathetic nervous system and the parasympathetic nervous system. The sympathetic nervous system triggers “flight or fight” mode of the body in response to stressful situations, whereas the parasympathetic nervous system calms down the body once the stressful state is over (Ulrich-Lai & Herman, 2009). When the brain detects danger, the amygdala interacts with the hypothalamus, leading to the activation of the hypothalamic-pituitary-adrenal (HPA) axis. This results in the production of the stress hormone known as cortisol. While this process is useful during short periods of stress, repeated activation can negatively affect the brain. Chronic stress has been shown to affect areas such as the amygdala, hippocampus, and prefrontal cortex (McEwen & Gianaros, 2010; Lupien et al., 2009).

This process is especially relevant when studying LGBTQ+ health since various stress factors like discrimination, stigma, rejection, and concealment of one’s identity can cause repeated psychological stress. The constant exposure to these kinds of situations might lead to continuous activation of stress mechanisms and increase vulnerability to anxiety, depression, and other mental health problems (Meyer, 2003; Hatzenbuehler, 2009). However, through neuroplasticity, the nervous system can also change, meaning that a favorable environment and acceptance may be helpful in dealing with stressful situations (Davidson & McEwen, 2012).

Stress Response, HPA Axis, Cortisol

Stress is a biological response that takes place in the body when there’s a perceived threat or challenge. Although stress begins with psychological processing, it involves communication between the brain, immune, and endocrine system. The systems involved in regulating stress are the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, which coordinate the body’s response to stressful experiences (Charmandari et al., 2005). The HPA axis activates when the brain detects stress. The hypothalamus releases corticotropin-releasing hormone (CRH), which causes the pituitary gland to produce adrenocorticotrophic hormone (ACTH). ACTH triggers the production of cortisol in the adrenal

glands; the hormone plays a role in controlling metabolism, immune function, and the body's response to stress (Charmandari et al., 2005). Cortisol is only beneficial during short periods of stress, and prolonged exposure could lead to the over-activation of the process, causing a dysregulation of the stress response system.

Chronic stress can cause changes in cortisol regulation, as well as produce long-term consequences on both the physical and mental state of people. Repeated activation of the stress system may be linked to inflammation, alterations in immune responses, and changes in brain regions involved in emotional regulation and cognition (Cohen et al., 2012). Also, long-lasting exposure to stressors is also connected to the development of decreased sensitivity to the stress hormones (Miller et al., 2007). This is especially relevant to the mental health of LGBTQ+ individuals because minority stressors—discrimination, stigma, and rejection—can create repeated psychological stress. Unlike temporary stressors, these experiences can happen again and again in the lifetime of a person, leading to persistent activation of biological processes in response to stress. According to studies on minority stress, the chronic presence of stigma can increase the susceptibility to anxiety disorders, depression, and other stress-related health problems (Meyer, 2003; Hatzenbuehler, 2009). On the other hand, stress responses are not always fixed. The brain can develop and change its functioning through a process known as neuroplasticity (McEwen, 2017).

Brain Regions Affected By Chronic Stress

Chronic stress can affect the functioning and anatomy of different areas of the brain that play a role in emotional regulation, memory formation, and decision making. The brain is very sensitive to environmental experience, which means that chronic stress can change how certain neural pathways function in the processing of emotions and reaction to stimuli. As the LGBTQ+ community faces chronic sources of stress like rejection, discrimination, and concealment, understanding the three brain areas—amygdala, hippocampus, and prefrontal cortex (McEwen, 2017)—can provide insight into the biological mechanisms of mental health.

First, the amygdala is a part of the brain responsible for detecting threats and emotional responses. When people encounter any stressful situation, the amygdala triggers the stress response of the body by sending signals to the hypothalamus, which then triggers the HPA axis (Roozendaal et al., 2009). Chronic exposure to stress increases their amygdala sensitivity, making them more sensitive to potential threats (Roozendaal et al., 2009). In the context of LGBTQ+ health, constant exposures to discrimination or fear of rejection can function as a social threat, potentially increasing emotional distress and vulnerability to anxiety-related symptoms (Hatzenbuehler, 2009). Second, another brain area that is impacted by chronic stress due to memory formation and stress response control is the hippocampus. Since the hippocampus has many stress receptors, it's constantly exposed to stress hormones, which can hinder it from functioning properly (Lupien et al., 2009). For LGBTQ+ individuals who face continuous stigmatization and rejection, their stress responses are being constantly activated which has a drastic impact on their memory of the stressful events and interpretation of future

social events. Such an anticipation of rejection is one of the psychological mechanisms in minority stress theory (Meyer, 2003). Third, the prefrontal cortex is involved in decision making, emotions regulation, and coping with stress. Normally the prefrontal cortex helps to regulate emotions by managing activity in the amygdala. However, chronic stress has the ability to interfere with the function of the prefrontal cortex, resulting in poor regulation of emotions and an ineffective management of stress (Arnsten, 2009). Because LGBTQ+ members are constantly exposed to environmental stressors over the fear of people judging them during their developmental years, prolonged stress may contribute to losing control of their emotions, making them susceptible to various mental health challenges.

These findings highlight how the experience of socialization can be biologically encoded into the brain itself. In addition to impacting thoughts and feelings, minority stress can impact the parts of the brain that process these experiences. But these changes are not irreversible, as the brain still possesses neuroplasticity. Positive environments and relationships could be used to alleviate such stress and enable more adaptive emotional regulation (Davidson & McEwen, 2012).

Minority Stress Theory & LGBTQ+ Mental Health

Minority stress theory explains how social stigma, discrimination, and rejection create additional stress for already marginalized populations. According to Meyer (2003), the LGBTQ+ group faces stressors that are different from the stressors faced by heterosexuals and cisgender people. They include external stressors such as discrimination and harassment as well as internal stressors such as fears of rejection, concealment of one's identity, and internalized stigma. Unlike temporary stressful events, minority stress can become chronic because LGBTQ+ people may encounter stigma across multiple environments. The effects of minority stress are reflected in significant mental health disparities among the LGBTQ+ population. In a study conducted by researchers at the National Institute of Mental Health, data from the National Survey on Drug Use and Health (NSDUH) were used, and 191,954 American adults took part in the survey, 14,693 of whom were classified as lesbian, gay, and bisexual. It emerged that the rates of suicidal ideation, suicidal plans, and suicide attempts among lesbian, gay, and bisexual adults were significantly higher than those of heterosexual adults. Even after controlling for demographic characteristics, it was established that the risk of suicide among lesbians, gays, and bisexuals was between three and six times that of heterosexuals (Ramchand et al., 2022; Mikulak, 2021). Furthermore, LGBTQ+ adults have a higher prevalence to experience anxiety, substance use disorders, and suicidal thoughts when compared to the heterosexual population (King et al., 2008). These differences are not fully associated with the sexual orientation of an individual, but rather related to discrimination and rejection experiences. These disparities are particularly concerning among the youth of LGBTQ+. According to the results of the 2024 National Survey on LGBTQ+ Youth Mental Health, 39% of the respondents stated that they had suicidal thoughts within a year, whereas 12% of the participants attempted

suicide (Nath et al., 2024). Also, according to this research, 90% of the respondents stated that politics and discrimination made them feel stressed.

One major element of minority stress is social rejection. It includes bullying, exclusion, and family rejection. There have been numerous studies that have shown that people who are discriminated against more often suffer from greater levels of psychological distress and have more chances to become depressed or anxious (Hatzenbuehler, 2009). Social rejection is especially important to look at from a neuroscience perspective because the brain reacts to social exclusion through the areas associated with emotional distress. Eisenberger et al. (2003) found that social rejection triggers the activity of the dorsal anterior cingulate cortex and anterior insula, regions that play a role in processing physical pain. Another important minority stressor is concealment. Individuals may choose to conceal their sexual orientation for the fear of facing repercussions. Although concealment reduces immediate vulnerability to discrimination, it also increases psychological stress as people need to constantly be aware about how they behave. As described by Meyer (2003), concealment was identified as a proximal stressor, which arises out of the anticipation of being rejected. Research studies have shown that sexual minorities who conceal their identities face more psychological distress than those experiencing acceptance (Pachankis et al., 2020). The biological effects of minority stress are directly related to the nervous system and stress response mechanisms discussed previously. The constant experience of discrimination could lead to the chronic activation of the sympathetic nervous system and HPA axis, affecting cortisol levels and brain regions involved in regulating emotions (Hatzenbuehler, 2009; Ulrich-Lai & Herman, 2009). This demonstrates the relationship between external experiences and internal brain processes.

Social Acceptance & Protective Factors

Although minority stress increases the risk of poor mental health outcomes, research has consistently shown that supportive environments can significantly reduce these negative effects. This does not mean that stressful experiences will be eliminated, but rather, that their occurrence will be reduced and minimized, improving both the psychological and physiological well-being (Ryan et al., 2009). Acceptance from families is one of the key protective factors for the LGBTQ+ community. According to the study by Ryan et al. (2009), young adults who identified themselves as members of the LGBTQ+ community during adolescence have experienced family acceptance and are healthier in terms of mental well-being when compared to those who have been rejected by their family. People who received support from their families had low levels of depression, substance abuse and suicidal tendencies. On the other hand, people who were rejected by their families are almost 8.4 times more likely to attempt suicide, 5.9 times more likely to suffer from depression, and 3.4 times more likely to use illegal substances (Ryan et al., 2009). External support is also important. Individuals who identify as LGBTQ+ and feel acceptance from friends, school, or community have been found to experience lesser levels of anxiety and psychological stress. For example, in The Trevor Project's 2024 National Survey on LGBTQ+ Youth Mental Health, it was found that 60% of

LGBTQ+ youth have at least one supportive adult figure, and individuals with a supportive adult figure have been found to be significantly less likely to engage in suicide attempts (Nath et al., 2024). Social acceptance can reduce repeated activation of the HPA axis and sympathetic nervous system due to low social threats. Low chronic stress levels can be beneficial for maintaining normal functioning of the cortisol cycle and protecting brain structures that play a role in the regulation of emotions, including the hippocampus and the prefrontal cortex (McEwen, 2017). Furthermore, Hatzenbuehler (2009) has suggested that minimizing the experience of stigma and enhancing social support would be able to break the psychological processes linking minority stress to poor psychological outcomes. Given the plasticity of the brain, the brain would be able to develop stronger pathways linked to resilience and emotional regulation because of social interactions (Hatzenbuehler, 2009). Together, these findings demonstrate that acceptance means not only being socially comfortable, but having physiological ramifications too. By reducing chronic stress and building resilience, supportive environments may protect both mental health and normal nervous system function among LGBTQ+ individuals.

Neuroplasticity

Neuroplasticity is the brain's ability to change its structure and function as a result of experiences throughout life. Rather than remaining fixed, the neural pathways are constantly being strengthened, weakened, or reorganized based on repeated thoughts, emotions, behaviors, and social interactions (Kolb & Gibb, 2011). Neuroplasticity is particularly significant to the study of mental health in the LGBTQ+ community because acceptance, belonging, discrimination, and rejection can influence both psychological well-being and the brain systems involved in emotional regulation. Adolescence and early adulthood are key periods in the maturation of both the brain and the identity itself. During this period, certain brain areas related to the regulation of emotions, self-awareness, and social decision-making are developing. In the case of many members of the LGBTQ+ community, this period is also associated with exploration or disclosure of their sexual orientation/gender identity. It was revealed that those people, who were hiding their identity out of the fear of being rejected, tended to suffer from psychological disorders more frequently than those, who were feeling safe while expressing themselves (Pachankis et al., 2020). Acceptance and belonging also play a role in increasing resiliency, which is the ability to adapt positively despite facing adversities. According to Frost & Meyer (2012), LGBTQ+ people who showed higher community connectivity and social support exhibited significantly better mental health and lesser psychological distress compared to those who were socially isolated. Research on resiliency has shown that supportive relationships improve one's ability to cope with stress through effective emotion regulation and coping mechanisms (Southwick et al., 2014). While resiliency may not mitigate minority stress altogether, it can certainly alleviate its effects on mental health. The brain's ability to adapt means that the effect of minority stress isn't permanent. Neuroplasticity implies that positive experiences such as being accepted by the family, having good friends, studying at supportive



schools, and living in inclusive communities can build neural connections necessary for regulation of emotions and healthy coping with stress and diminish the negative effect of stress. This link between positive experiences and resilience is another important point which is drawn in this work: the mental health of LGBTQ+ people depends not only on the stress they experience because of the discriminatory environment, but also on the supportive environment promoting resilience.

Neuroimaging Evidence

fMRI, a neuroimaging technology, has provided the means to study changes in brain activity by analyzing the changes in blood oxygen levels via the BOLD signal. With this technology, it became possible to look at how psychological events, such as social rejection, acceptance, and chronic stress affect brain areas responsible for emotional regulation, threat detection, and decision making. One of the earliest investigations exploring the impact of social rejection on brain function was done by Eisenberger et al. (2003). With the use of fMRI, scientists have explored 13 participants playing a game where participants felt socially excluded and observed heightened brain activity in the dorsal anterior cingulate cortex and anterior insula, which is responsible for detecting physical pain and social threat. Though this study does not focus on any LGBTQ+ people, it helps to understand the neurological mechanism, which explains the reasons why the discrimination or feeling of rejection may have negative effects on mental wellbeing. Also, according to The Trevor Project's 2025 U.S. National Survey on the Mental Health of LGBTQ+ Young People, 36% of LGBTQ+ youth seriously considered attempting suicide within the last year, while 1 out of every 10 LGBTQ+ youth attempted suicide within that time. Moreover, 90% of LGBTQ+ youth stated that recently passed anti-LGBTQ+ laws and discussions had influenced their stress or anxiety levels adversely (Nath et al., 2026). Neuroscience research provides insight into how these experiences may affect the brain. Social stress that occurs regularly may affect the way different areas of the brain communicate in regard to emotions; for example, these include the amygdala, hippocampus, and prefrontal cortex. The amygdala is responsible for the detection of threat and danger, while the prefrontal cortex controls emotions and makes decisions. This discrepancy may be a risk factor for the development of anxiety disorders and depression among others. Even though these results are not gathered from fMRI studies targeting the LGBTQ+ population but rather from neuroscience studies, they shed light on how chronic social stress may impact brain networks regulating emotions. Research focused on the LGBTQ+ community also highlights the significance of a supportive social environment. As can be seen from the 2025 survey conducted by The Trevor Project, LGBTQ+ individuals who grew up in accepting neighborhoods had less than one-third the rate to commit suicide compared to individuals living in non-accepting communities. This shows that aside from being correlated with positive social experiences, acceptance leads to great improvements in mental health results. Acceptance environments may help lessen the experience of social stressors as well as foster better emotional control and resiliency.

Recent studies suggest that the brain remains adaptable throughout life, meaning that the neurological effects of chronic stress can be reversed. While exposure to discriminatory and alienating experiences might result in the reinforcement of the neurological connections related to stress, there are other experiences that can promote more efficient emotional regulation and coping mechanisms, such as nurturing relations, supportive healthcare environment, and positive schooling experience. In general, the use of neuroimaging techniques offers biological evidence for the link between minority stress and the mental well-being of the LGBTQ+ community. Instead of being separate entities, the mind and brain interact constantly and continuously influence each other. Experiencing stigma and rejection can trigger neural circuits responsible for stress responses and emotional processing, whereas acceptance and inclusion can counteract their effects and enhance resilience. Together, these findings support the central question of this paper by demonstrating that the well-being of LGBTQ+ individuals is shaped by both psychological experiences and the brain's response to those experiences.

Conclusion

Despite the fact that there are usually mental health disparities in the LGBTQ+ population, the studies on this topic are typically conducted mainly using a psychological lens. It is important to understand the neurological impacts of social experiences to have a more holistic understanding of the wellbeing of the LGBTQ+ population. In addition to its psychological impact, minority stress can also have physiological impacts on the body due to factors such as discrimination, rejection, and stigma. On the contrary, acceptance and positive relations are protective mechanisms. Because social environments influence both psychological and biological health, creating supportive environments is significant for enhancing the well-being of the LGBT community. The families, schools, healthcare providers, and communities may contribute to decreasing stress generated by discrimination and rejection. Future studies of the interplay between psychology and neuroscience may shed light on the mechanisms by which these processes influence the brain and make some individuals more resilient to them. In general, LGBT mental health is shaped by both individual factors and social environments.

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