

PERSPECTIVE SOCIAL INCLUSION

The Neuroscience of Social Exclusion: Developmental and Public Health Implications Across the Life-Course

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Received: 21 October 2024

Accepted: 16 December 2024

Published: 07 March 2025

DOI

10.25259/IJTMRPH_85_2024

Quick Response Code:



ABSTRACT

The Ibero-American community, through the Ibero-American Network of Cognitive Neuroscience, is actively discussing the neurocognitive effects of social exclusion, which generates inequitable access to resources and interpersonal relationships. Ibero-Americans, including those in Spanish and Portuguese-speaking countries, have identified teen parents' families as one of the marginalized populations suffering social exclusion and thus have measurable physiological impacts on neurocognitive development. Social stress in teen mothers is prevalent, with 48% of young mothers reporting high toxic stress levels. Multiple studies have identified high levels of fetal cortisol due to high maternal stress, which has been found to increase neurocognitive development and behavioral pathologies. These physical and systemic environmental risk factors have been recognized to act in a cumulative and life-course manner, promoting cyclical and multigenerational impacts for families and communities. We argue that this compelling evidence should generate a deep self-assessment of our deeds as professionals and community since our biases and marginalizing actions as a system produce profound and life-course negative health outcomes for teen parents' families.

Keywords: Cognitive Neuroscience, Social Inclusion, Teen Parents, Teen Mothers, Teen Fathers

Puerto Rico is a United States' territory with an estimated population of 3.2 million. In Puerto Rico, 38.9% of all live births occur to young mothers (10–24 years), and 7.8% of live births were to mothers of 15–19 years of age, as reported for 2020.^[1] Teen mothers, teen fathers, and their families are impacted by social exclusion mechanisms that involve socioeconomic position, life-course protective factors, and nurturing family environment conditions.^[2] Proyecto Nacer, in Puerto Rico, is a non-profit organization that developed and implements a service model based on the complex systems theory, which is a social inclusion model aligned and uses a family-centered approach, known as the Family Incubator Model, as illustrated in Figure 1, where the social inclusion model was adapted to demonstrate the ecological interactions upon the organization's wrap-around services.^[3]

The Family Incubator Model was developed in the year 2000 and has been used to serve thousands of teen parents' families using a three-generation approach.^[2] In June 2024, Proyecto Nacer's teen parents had the following sociodemographic profile: 90% were single mothers, 10% single fathers, with an average age of 17.4 years, 74% reported having extremely low annual household income (\$9,999 or less), and where 68% of their parents had a high school diploma as their highest academic achievement; 72% had one child, 14% were pregnant, and 74% of these

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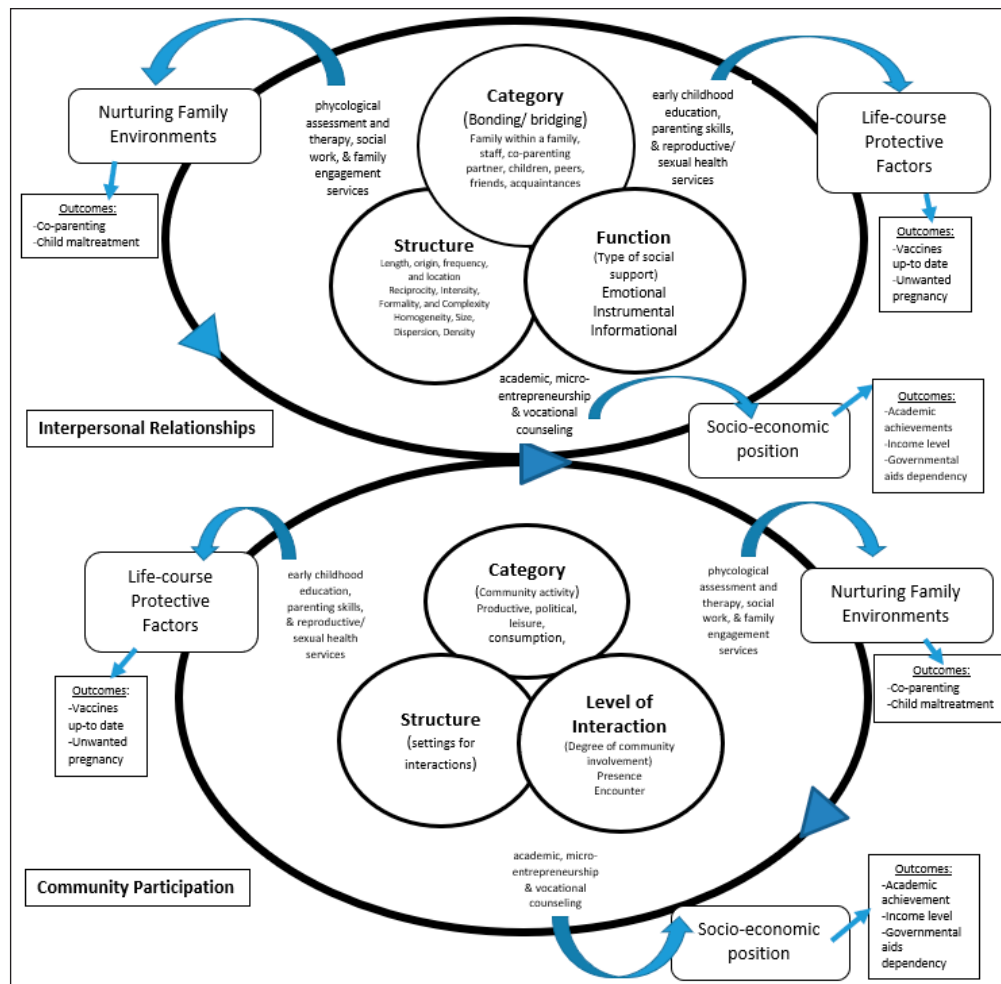


Figure 1: Adaptation of the social inclusion model: Proyecto Nacer’s interventions and outcomes.

teen parents reported to have dropped out of school because of an unplanned pregnancy, with 45% doing so in 9th grade or before. It is essential to observe this sociodemographic profile since poverty, teen parenting, school dropouts, and other conditions are socially sanctioned through stigma and marginalization and are an intrinsic source of social stress in teen mothers, children born to adolescents, and their families. Adolescent parents’ families, such as the ones served by Proyecto Nacer’s comprehensive model of service, reflect disparities in social determinants of health, which in turn act as social exclusion mechanisms.

In postindustrial Puerto Rico, general social expectations for teenagers are to complete a professional or academic degree, obtain a job, establish a formal relationship with a partner, and then have children. Thus, when teenagers become parents, multiple social stressors arise which act in addition to previous exclusion precursors fueled by stigma, inadequacy perception, and a deficit-based perception of positive parenting, goal achievements, and expected

contribution to social capital. Due to age and legal capacity, teen parents in Puerto Rico are not legally able to undergo contracting for housing, have a full-time job, or register their child in the Demographic Registry without their parent’s signature, which subjugates them to their parents’ will. Thus, teen parents are perceived as lacking and unable to make good decisions, as well as unable to provide for and protect their children, while their parents are socially perceived as deficient since their children became pregnant due to their inability to guard them, and their children born to teenagers are immediately identified as at risk of maltreatment or worthy of pity, in general.

On the one hand, social exclusion mechanisms and pathways are recognized in the social inclusion model as a systemic and socioecological issue.^[4] On the other hand, neuroscience meta-analysis research has demonstrated that social exclusion activates brain regions related to social pain processing, such as the dorsal and ventral anterior cingulate cortex. Social pain is a distressing emotional response associated with a

perceived or actual sense of social connectedness or value due to social exclusion, rejection, or fear of being negatively perceived.^[1,5] We argue that public policies, regulations, social stigma, socioeconomic barriers, and intrinsic factors related to mental, emotional, and underdeveloped skills, to name a few, promote exclusion mechanisms that entail measurable social pain, stress, and trauma with potentially negative results in neurocognitive outcomes for teen parents' families living in Puerto Rico. If harsh societal conditions persist in teen mothers when they are pregnant, they can generate negative health outcomes throughout the life course, including heart disease, diabetes, and asthma for their children.^[6] Furthermore, the results of social pain through social exclusion hurt society, as potential resources and positive interpersonal interactions are lost or removed to rehabilitate negative societal and health outcomes in the future.

CONCLUSION AND IMPLICATIONS FOR TRANSLATION

Highly toxic stress hormones, such as cortisol and fetal cortisol, have been measured to teen mothers and pregnant teens, who reported feeling marginalized and socially excluded.^[7] Thus, social exclusion plays a significant role in the lives of 38.9% of all mothers, who gave birth being an adolescent in Puerto Rico.^[1] It is known that stress hormones can cause severe inflammation in the body leading to negative health outcomes throughout the life-course, generating shorter life expectancy and reduced well-being. Multiple actions are being done to promote better health for teen parents' families in the Ibero-American community, including active discussion in forums, plans for joint research studies, and amendments to doctoral studies curricula. We conclude that social exclusion precursors in teen parents' families can be prevented, mitigated, and eliminated, leading to better interpersonal relationships and access to resources for all society.

Key Messages

1. The Family Incubator Model, developed by Proyecto Nacer, contains evidence-based practices that promote the social inclusion of adolescent parents' families through inter- and intra-systemic mechanisms, addressing the social determinants of health as generators or protectors against marginalization, which according to cognitive neuroscience, produces social pain. 2. Scientific evidence suggests that the negative neurological effect produced by social pain or social exclusion can be mitigated or prevented by removing social stressors in families of adolescent parents. 3. Changes in

public policy, promotion of best practices that are based on the complex systems theory and interventions against social stigma are required to address the negative health impact on adolescent parents' families.

Acknowledgments

None.

COMPLIANCE WITH ETHICAL STANDARDS

Conflicts of Interest: Dr. Túa-Lopez is a member of the editorial board of Int J Transl Med Res Public Health. **Financial Disclosure:** Nothing to declare. **Funding/Support:** There was no funding for this study. **Ethics Approval:** Not applicable. **Declaration of Patient Consent:** Patient consent is not required as there are no patients in this study. **Use of Artificial Intelligence (AI)-Assisted Technology for Manuscript Preparation:** The authors confirm that there was no use of Artificial Intelligence (AI)-Assisted Technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI. **Disclaimer:** None.

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How to cite this article: Túa-López A, Román F. The neuroscience of social exclusion: Developmental and public health implications across the life-course. *Int J Transl Med Res Public Health.* 2025;09:e005. doi: 10.25259/IJTMRP_85_2024