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Elderly Suicide from an Evolutionary Psychology Perspective

Yinxuan Jiang[1*], Zhihui Ma[2]

[1]School of Psychology, University of Birmingham, Birmingham, UK
[2]Jinqiu International, Qingdao, China
**Corresponding Author. Email: yxj418@student.bham.ac.uk*

Abstract. Elderly suicide is a pressing public health issue characterized by notably high rates in many countries, including China. From an evolutionary psychology perspective, suicide represents a paradoxical, counter-evolutionary behavior that appears to reduce an individual's inclusive fitness—the ability to pass on genes directly or indirectly through kin. This study investigates elderly suicide through the lens of inclusive fitness model, which suggests that under conditions of resource scarcity, older adults may opt for suicide as an adaptive mechanism to alleviate burdens on their kin while also promoting the wellbeing and future reproductive potential of younger relatives.The study hypothesizes that elderly individuals who perceive themselves as financial or emotional burdens to their families develop feelings of hopelessness and depression. Depression initially promotes rumination and social signaling aimed at eliciting support; however, when these efforts fail, cognitive confusion and impulsivity may emerge, weakening natural survival instincts and increasing suicide risk. We plan to conduct the study in several steps to illustrate the inclusive fitness model, and we will discuss the expected outcomes and implications. The plan of study could highlight adaptive mismatch, where evolutionary mechanisms misfire in modern social environments, stressing the need to address financial and emotional burdens through programs that enhance emotional connectivity, social roles, and community support to reduce elderly suicide risk. However, the plan also has limitations including self-reported data bias, sampling issues, and challenges applying evolutionary models across cultures, with future research urged to develop cross-cultural, multilevel interventions targeting psychological, family, and societal support.

Keywords: Elderly suicide, evolutionary psychology, inclusive fitness

1. Introduction

Suicide among the elderly is a significant public health concern, with notably high rates observed in many countries, including Canada [1] and China, particularly in rural areas [2]. This phenomenon is paradoxical from an evolutionary psychology perspective, as suicide represents a counter-evolutionary behavior that seemingly reduces an individual's inclusive fitness [3] and indirect genetic contribution to future generations. Historically, evolutionary theories suggest that in times of resource scarcity or environmental stress, elderly individuals may choose suicide as an adaptive strategy to alleviate the burden on their kin, thereby enhancing the survival and reproductive success

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of their descendants [4]. This behavior reflects the principle of inclusive fitness, as described by Hamilton [5], in which individuals promote the transmission of shared genes both through personal reproduction and by supporting close kin [6]. Therefore, suicide might be an adaptation organisms use to increase benefits for their relatives. However, this theory explains why suicidal aspiration emerges but not why it is enacted. Suicide is an extreme altruistic behavior that likely represents an evolutionary mismatch [7] as it conflicts with the natural desire for survival. Joiner suggested that people may become capable of suicide when they feel disconnected, believe they are a burden, and think they can follow through with self-harm [8]. Elderly people do not “choose” suicide consciously; rather, they act from a state of hopelessness and isolation. To better understand this complex behavior, this paper has a focus on exploring both revolutionary theories of resource-based suicide and the psychological factors that drive suicide in older adults providing a foundation for more effective prevention strategies that consider social and biological influences.

2. Hypothesis

The study proposed that elderly individuals experiencing perceived resource scarcity and burdensomeness develop feelings of hopelessness [9], triggering depression. Depression initially promotes rumination and social signaling intended to garner social support or external change. However, when these tactics fail, cognitive confusion and impulsivity may emerge [10], impairing the natural survival instinct. Prolonged physical and emotional pain may induce a numb state [11], lowering resistance to death impulses. Thus, suicide can be viewed as an error byproduct when regulatory mechanisms fail.

H1a – Parents may show higher suicide risk when they perceive themselves as a financial strain on their families, potentially leading to hopelessness, depression, and impulsive decisions.

H1b – Those with children might be more vulnerable to suicidal thoughts if they believe their presence causes emotional distress to their families, intensifying feelings of isolation and loss of purpose.

3. Methods

We thus proposed a study to explore the above two hypothesis. All the descriptions below are just our research plan.

3.1. Participants

The main group will include adults over 65 with children and varied health and social backgrounds, so we can make sure if the outcomes are suitable for every elder individual. The control group will consist of the same aged individual with no children.

3.2. Eye-tracking study design

Participants will view stimuli comprising negative/self-deprecating sentences (e.g., "I’m a financial/emotional burden to my family"), positive/affirmative sentences (e.g., "I’m an important part of the family"), and neutral information. We will record where and how long participants focus their gaze, in order to examine attention biases tied to self-perception [12].

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3.3. Depression assessment

Depression will be measured with the HDRS and BDI-II, capturing both clinician and self-report data [13,14].

3.4. Temporal discounting task

Impulsivity will be assessed through tasks that test preference for quick but smaller rewards instead of waiting for larger ones [15]. This tendency has been linked to suicide risk [10].

3.5. Longitudinal tracking and suicide ideation measurement

Perceived Resource Scarcity / Burdensomeness
↓
Elevated Depression Scores (HDRS, BDI-II)
↓
Increased Impulsivity (Temporal Discounting)
↓
Suicidal Ideation (BSS) and Risk

3.6. Expected outcomes

Results Supporting the Hypothesis:

Eye-tracking data show that elderly participants with children exhibit a significant attentional bias toward negative/self-deprecating sentences, which correlates positively with depression scores.

The elderly group with children scores significantly higher on the HDRS and BDI-II compared to the group with no children, with depression levels positively associated with perceived resource scarcity and burdensomeness. Elderly individuals who have children with higher depression or suicide risk demonstrate increased temporal discounting, favoring smaller immediate rewards over larger delayed ones, indicating a link between impulsive decision-making and suicide risk. Follow-up data reveal worsening depression and increasing suicidal ideation over time in those perceiving resource scarcity and burdensomeness; inflammatory markers such as CRP show positive correlations with depression and suicide risk.

Results Not Supporting the Hypothesis:Eye-tracking reveals no significant differences in attentional bias between elderly participants either with children or not; in some cases, group who has children show greater attention to positive/affirmative stimuli. Depression scores among older adults with children do not significantly differ from those without children and no clear associations emerge between depression and perceived burdensomeness or resource scarcity. The elderly group with children shows lower or comparable temporal discounting rates relative to group with no children, with no significant correlations to depression or suicidal ideation. Suicidal ideation incidence is low with no clear increasing trend; inflammatory biomarkers do not correlate significantly with psychological measures.

Mixed and Complex Results:Eye-tracking results exhibit considerable individual variability; some elderly participants who have children show strong negative attentional biases, while others display neutral or even positive attentional patterns, possibly reflecting different coping mechanisms.

There are discrepancies between self-reported and clinician-rated depression scores; depression may only manifest beyond certain thresholds of perceived burdensomeness.

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Only a subset of elderly with high depression shows increased impulsivity; impulsive decision-making fluctuates with short-term emotional states and context.

Suicidal thoughts vary across time and tend to co-occur with major stressors like financial strain or family tension; biological markers demonstrate delayed or nonlinear associations with psychological states.

4. Findings and discussion

For this study, the evolutionary function of elderly suicide are strongly supported by existing literature on elderly evolutionary psychology and suicide. The main hypothesis focused on the role of perceived emotional burdensomeness and financial burdens as a critical factor that are influencing the suicidal behaviors in older adults with the inclusive fitness theory providing a compelling evolutionary explanation. The expected outcomes could be supporting hypothesis H1a: elderly people who believe they are a financial strain to their family face a greater chance of suicidal ideation and behavior [16]. When cultural habits mean that seniors support their families financially, not being able to do so can create a lot of guilt and self-doubt. In this case, the inclusive fitness approach offers an explanation: older adults may minimize what they use to increase the prospects of their relatives to survive and have descendants [17]. Similarly, hypothesis H1b, concerning emotional burdensomeness, if it is supported by expected results that feelings of being a social or emotional drain on loved ones significantly predict suicidal thoughts and attempts in elders [18]. Emotional burdensomeness intensifies hopelessness and depression, which in turn foster rumination and social withdrawal—factors strongly linked to suicide risk [9]. These psychological states can disrupt normal survival instincts by increasing cognitive confusion and impulsivity, consistent with Alzeer and Benmerabet model linking impulsivity to late-life suicide [19].

The integration of inclusive fitness theory offers a unique evolutionary context to understand why elderly individuals might consider suicide. From this viewpoint, suicide may paradoxically function as an adaptive strategy to relieve kin from the perceived costs associated with aging individuals who can no longer contribute resources or social capital [20]. This theory helps reconcile the apparently counterintuitive act of suicide with evolutionary imperatives by framing it as a potential mechanism for maximizing genetic legacy indirectly [21]. Moreover, biological correlates such as elevated inflammatory markers like C-reactive protein (CRP) have been linked with depression and suicidal behavior in the elderly [22]. These findings support the notion that prolonged physical and emotional distress can impair regulatory processes governing survival, further increasing suicide risk. In sum, existing literature robustly supports the hypotheses that perceptions of financial and emotional burdens contribute significantly to elderly suicide risk and that inclusive fitness theory provides a valuable explanatory framework. Future empirical studies should build upon this foundation to test these relationships more directly, incorporating longitudinal designs and biological measures to deepen understanding and guide prevention efforts.

5. Limitations

There are also limitations of the plan. Most importantly, suicidal ideation relies heavily on self-reported data collection, which may be influenced by cultural taboos, social expectations or psychological defence mechanisms, and may lead to underestimation or even bias in the data as older people may deliberately hide or deny their true thoughts. Also, as the participants are gathered from community centers and medical facilities, some high-risk populations of suicide might be neglected. Such as older adults who live alone, have limited mobility, and who refuse to take part in

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social activities. Online surveys might also exclude the older adults who aren't familiar with digital devices. Making the sample pool leaning towards the highly educated or the affluent. There might be cultural and individual bias in measures for there are significant differences between the current social structure and the early environment of human evolution, such as loosened family relationships, strengthened individualism, and complex resource allocation, which makes the evolutionary mechanism may not be fully applicable to explaining the psychology and behaviour of modern elderly people. Similarly, there could be a lack of theoretical and empirical support for how different cultures influence the creation, interpretation and expression of burden, which affects the extrapolation of the results. Individual differences were also not adequately considered in this study, and the definition and experience of the concept of "burden" may vary greatly among older adults.

6. Conclusion

The planned procedure could conclude that suicide in the elderly may result from incorrectly judging evolutionary factors, a process called adaptive mismatch. Such misjudgment of what the family and relatives contribute to the deceased's well-being can lead individuals to wrongly think their passing is useful for their families, since they imagine that their relatives are worse off alive. We understand from inclusive fitness why older people no longer feel their own reproductive value matters and often choose to leave the group. The planned procedure could also suggest that financial and emotional burdens are often not independent of each other but interact in real-life situations, posing psychological and social dilemmas. Effective suicide prevention strategies for older adults should address both economic and emotional dimensions, not relying solely on mental illness screening or material assistance. Enhancing older people's emotional connection to family and sense of self-worth is more effective than short-term pharmacological interventions. Helping older adults rebuild their social roles and increase their presence in the community can also reduce suicide risk. Policy recommendations include promoting a dual-track model that integrates community care and family support, encouraging participatory employment and social role continuation for the elderly, and promoting a dual-track model that integrates community care and family support.

Future research should prioritize cross-cultural tests of kin selection hypotheses to design a multilevel integrated intervention programme that spans the personal, familial, and community spheres. Where the personal domain should emphasize mental resilience and value reorientation; the family level should focus on communication and consensus; and the societal level should focus on promoting the synergy of structural support systems (e.g., community, policy, and healthcare).

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