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ECONOMIA,
DESENVOLVIMENTO
E GLOBALIZAÇÃO
EDG 2024

18
MARÇO
2024

PROCEEDINGS BOOK

INVESTIGAÇÃO & DESENVOLVIMENTO

ORGANIZAÇÃO

Prof. Doutor Carlos Rodrigues

Prof.ª Doutora Ana Campina

Prof.ª Doutora Sandra Bernardo

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Subject – Research & Development

18 March 2024 – Monday / Fernando Pessoa University / I3ID/CEPESE Porto, Portugal

Portuguese, English, French e Spanish

Hybrid

SITE/LINK - https://www.ufp.pt/edg2024/

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1. **https://www.youtube.com/watch?v=ThxhylBBG3Q&pp=ygUDdWZw**
2. **https://www.youtube.com/watch?v=OspPa3Efv4E&pp=ygUDdWZw**

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Objetivos e Áreas Científicas

Objetivos: Se analisamos o número de patentes de origem portuguesa registadas a nível nacional e europeu, verificamos que no ano de 2021 ascenderam a 208 e 116, respetivamente. Esta realidade é suportada na investigação desenvolvida por 59.160 investigadores, 26.537 de empresas e 29.766 do ensino superior, o que significou um investimento total no ano de 2022 de 4.124.124,4 milhares de EURO, correspondendo a 2.566.389,3 milhares de EURO pelo tecido empresarial e 1 284 191,4 milhares de EURO pelo ensino superior.

O objetivo da conferência é provocar um amplo debate sobre a Investigação & Desenvolvimento e como é que os múltiplos agentes, sobretudo as empresas e o ensino superior, a desenvolvem e a aplicam no desenvolvimento económico, quer de raiz local, regional ou global, contribuindo através dela para o desenvolvimento empresarial, e, em última análise, para o bem-estar social.

Áreas Científicas: A temática em discussão abrange todas as áreas do saber, contudo dedica-se, por excelência, às áreas das:

1. Ciências empresariais;
2. Economia;
3. Ciência Política e Relações Internacionais;
4. Criminologia;
5. Psicologia;
6. Medicina e outras ciências da saúde;
7. Arquitetura;
8. Engenharia;

Objectives and Scientific Areas

Objectives: Analyzing the number of patents of Portuguese Origin registered at National and European levels, allows to conclude that in 2021 it was increased to 208 and 116 respectively. This reality is supported by the research carried out by 59,160 researchers, 26,537 from companies and 29,766 from higher education, which meant a total investment in 2022 of 4,124,124.4 thousand EUROS, corresponding to 2,566,389.3 thousand EUROS by the business community and 1,284,191.4 thousand EUROS by higher education.

The main objective of the Conference is to provoke a wide-ranging debate on *Research & Development* and how the several players, especially companies and higher education, develop and apply it to Economic Development, being at a local, regional, or global level, contributing to the business development and, consequently, to the social well-being.

Scientific Areas: The subject under discussion covers all areas of knowledge, however, it is dedicated, *par excellence*, to the following areas:

1. Business Sciences;
2. Economy;
3. Political Science and International Relations;
4. Criminology;
5. Psychology;
6. Medicine e other Health Sciences;
7. Architecture;
8. Engineering.

PROGRAMA / PROGRAM

08:30 horas – Receção/Reception

09:15 horas – Sessão de Boas-vindas/Welcome Sessions

Faculdade de Ciências Humanas e Sociais, UFP – Diretor/ Faculty of Social and Human Sciences UFP – Diretor – Professor **Pedro Reis**

Organização/Organization: Prof. **Carlos Rodrigues**; Prof.ª **Ana Campina**; Prof.ª **Sandra Bernardo**

09:30 horas – Palestra de abertura/Opening Lecture

AEP – Associação Empresarial de Portugal – **Presidente do Conselho de Administração/**AEP – Portuguese Business Association **– Chairman of Executive Board – Dr. Luis Miguel Ribeiro**

10:00 – 11:30 horas - Mesa-redonda – TEMA – *"A investigação nas Universidades e a sua interação com a evolução do conhecimento/ensino"/* ***Round Table – SUBJECT*** *– "Research at universities and its interaction with the evolution of knowledge/teaching"*

Moderador/Moderator: Prof. Doutor **Ricardo Jorge Pinto** – Universidade Fernando Pessoa/University Fernando Pessoa

Oradores/ Speakers:

Universidade de Santiago Compostela – Espanha – **Reitor/**University Santiago Compostela – Spain – **Rector – Professor Antonio López Díaz**

ATÜ – Adana Alparslan Türkeş Science and Technology University – Turquia/Turkey – **Vice-Reitor/Vice-Rector Professor Serdar Yildirim**

Universidade da Maia/University of Maia – **Reitor/Rector – Professor José Ferreira Gomes**

Universidade de Aveiro/University of Aveiro – **Vice-Reitor/Vice-Rector – Professor João Veloso**

Universidade do Minho/University of Minho – **Vice-Reitor/Vice-Rector – Professor Eugénio Campos Ferreira**
Universidade Fernando Pessoa/University Fernando Pessoa – **Reitor/Rector – Professor Álvaro do Nascimento**

12:00 – 14:00 horas – ALMOÇO/LUNCH

14:00 – 15:30 horas - Mesa-redonda – TEMA – *"A investigação como motor do desenvolvimento"*/**Round Table – SUBJECT –** *"Research as a driving force for development"*

Moderador/Moderator: Dr. António Larguesa – Jornal ECO/ECONEWS – Porto - Portugal

Oradores/Speakers:
CCDR-NORTE – **Eng. Rui Monteiro**, Coordenador da/Coordinator of OADR
GALP – **Dr. João Costa Ribeiro,** Director – Open Innovation – Academia Engagement & Int.Ecosystems
EDP – **Dr. Tomás Loureiro**, Head of Innovation Intel
LIPOR – **Engª Benedita Chaves**, Gestora da Unidade de Investigação, Desenvolvimento e Inovação/Manager of Research, development and innovation Unity
BOSCH – **Eng.º Carlos Ribas**, Administrador Técnico da Bosch em Braga/Technical Administrator Bosch in Braga
VESTAS – **Eng.º Pedro Pastilha**, Diretor-Geral do Vestas Technology Centre Porto (VTCP)/General-Director Vestas Technology Centre Porto (VTCP)

16:00 – 17:30 horas - Mesa-redonda – TEMA – *"A investigação científica ao serviço da saúde – interações entre as empresas e as universidades"*/***Round Table – SUBJECT –*** *"Scientific research at the service of health – interactions between companies and universities"*

Moderador/Moderator: Professor António Tavares, Universidade Lusófona do Porto e Provedor da Santa Casa da Misericórdia do Porto/Lusófona University – Porto and Providor – Santa Casa da Misericórdia do Porto – Portugal

Oradores/Speakers:

BIAL – **Dr. Miguel Portela**, Executive Vice-President and Chief Corporate Officer

IPATIMUP – **Professor Jorge Lima**, Vice-Director and Head of R&D

FP- I3ID – **Professor José Calheiros**, Full Professor, Director FP- I3ID

18h00 – Sessão de Encerramento/Closing Session

Faculdade de Ciências Humanas e Sociais, UFP – Diretor/ Director of Faculty of Human and Social Sciences, UFP – Professor **Pedro Reis**

FP- I3ID – Director, Professor **José Calheiros**

Organização/Organization: Prof. **Carlos Rodrigues**; Prof.ª **Ana Campina**; Prof.ª **Sandra Bernardo**

SESSÃO PARALELA / PARALEL SESSION

PROGRAMA / PROGRAM

1st Parallel Session

14h00 to 15h20

UFP - Room 205

MODERATOR - Prof.ª Ana Salazar - UFP

SPEAKERS:	COMMUNICATION:
André Souza	*The impact of digital influencers on the consumption of banking services of fintechs among generation y consumers in Brazil*
Joao Casqueira Cardoso Álvaro Campelo Alzira Dinis Fernando Bandeira Isabel Silva Ana Araújo Elvira Barry	*The risk-e-scape project: Building humanitarian action tools in an international collaboration*
Kati, Suomi Lígia, Rebelo Gomes Päivikki, Kuoppakangas	*Unleashing innovation: Exploring the impact of PHD holders on innovation in small and medium enterprises*
Luís Borges Gouveia, Amaro Fernando da Fonseca Correia	*O 5G na mobilidade das cidades inteligentes*

2nd Parallel Session

15h30 to 16h50

UFP – Room 205

MODERATOR - Prof.ª Daniel Seabra - UFP

SPEAKERS:	COMMUNICATION:
Nuno Eduardo Roxo Rodrigues Cravo Barata	*Teoria da mente em crianças com perturbação do neurodesenvolvimento*
Rute F. Meneses Carla Barros Ana Isabel Sani	*Economic development vs sustainability, research & development – A contribute from health psychology*
Tatiana J Marrufo Bettencourt Ps Capece Maria-Raquel G Silva	*Influence of artisanal mining and environmental pollutants on food security in southern Africa*

PHOTO GALLERY

CONFERÊNCIA/CONFERENCE

FOTO 1 – Alunos/Students

FOTO 2 – Sessão de Boas-vindas/Welcome Sessions

FOTO 3 – Sessão de Boas-vindas/Welcome Sessions

FOTO 4 – Palestra de abertura/Opening Lecture

FOTO 5 – Palestra de abertura/Opening Lecture

FOTO 6 – Palestra de abertura/Opening Lecture

FOTO 7 – Primeira Mesa-redonda/ First Round Table

FOTO 8 – Primeira Mesa-redonda/ First Round Table

FOTO 9 – Primeira Mesa-redonda/ First Round Table

FOTO 10 – Segunda Mesa-redonda / Second Round Table

FOTO 11 – Segunda Mesa-redonda / Second Round Table

FOTO 12 – Segunda Mesa-redonda / Second Round Table

FOTO 13 – Terceira Mesa-redonda / Third Round Table

FOTO 14 – Terceira Mesa-redonda / Third Round Table

FOTO 15 – Terceira Mesa-redonda / Third Round Table

FOTO 16 – Sessão de Encerramento / Closing Session

FOTO 17 – Sessão de Encerramento / Closing Session

1st PARALLEL SESSION

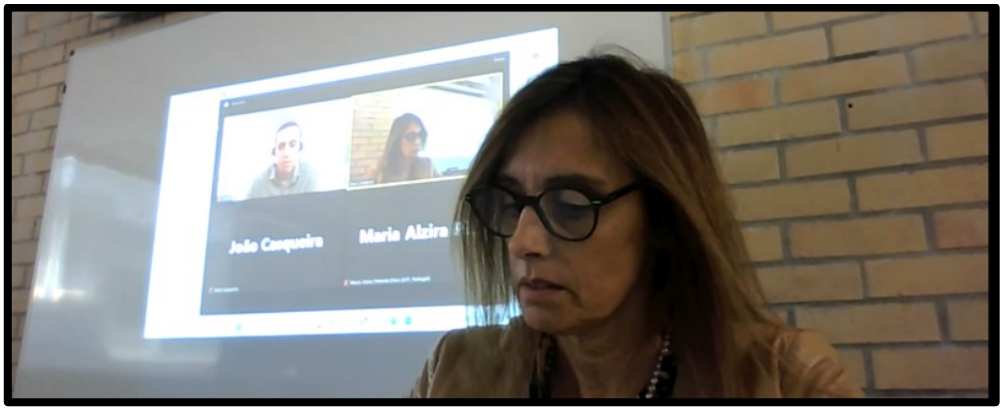

FOTO 18 – **MODERATOR - Prof.ª Ana Salazar** - UFP

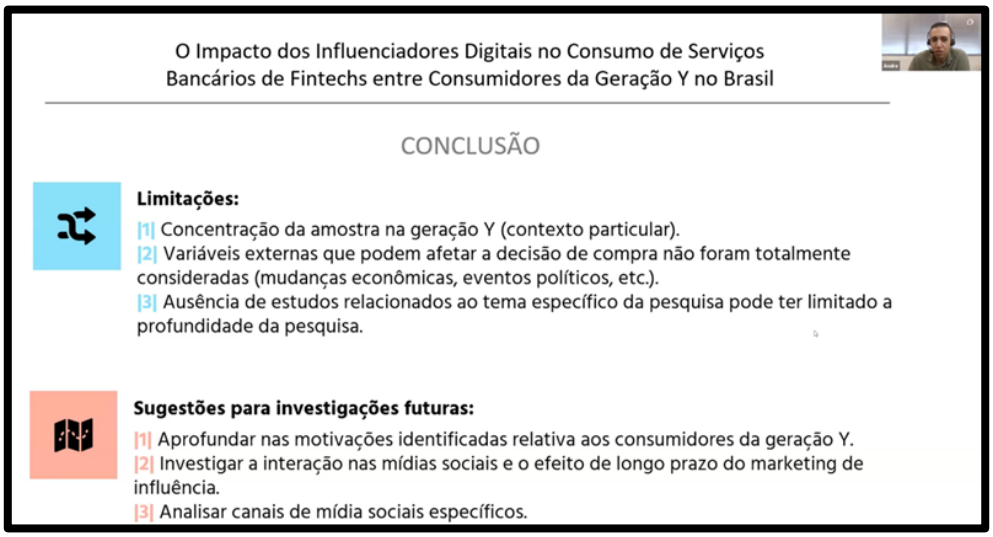

FOTO 19 – André Souza

FOTO 20 – **Joao Casqueira**

FOTO 20 – Lígia Rebelo Gomes

FOTO 21 – Luís Borges Gouveia

2nd PARALLEL SESSION

FOTO 21 – MODERATOR - Prof.ª Daniel Seabra - UFP

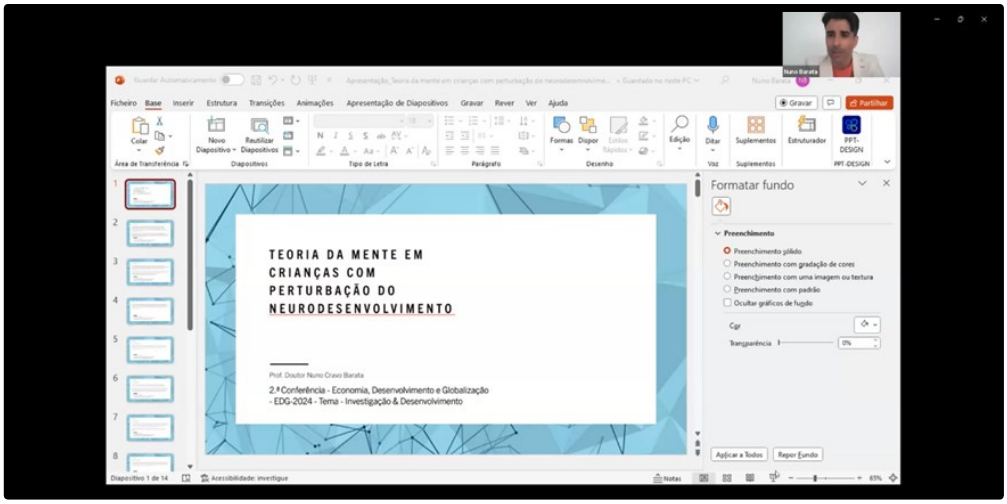

FOTO 22 – Nuno Eduardo Roxo Rodrigues Cravo Barata

FOTO 23 – Rute F. Meneses

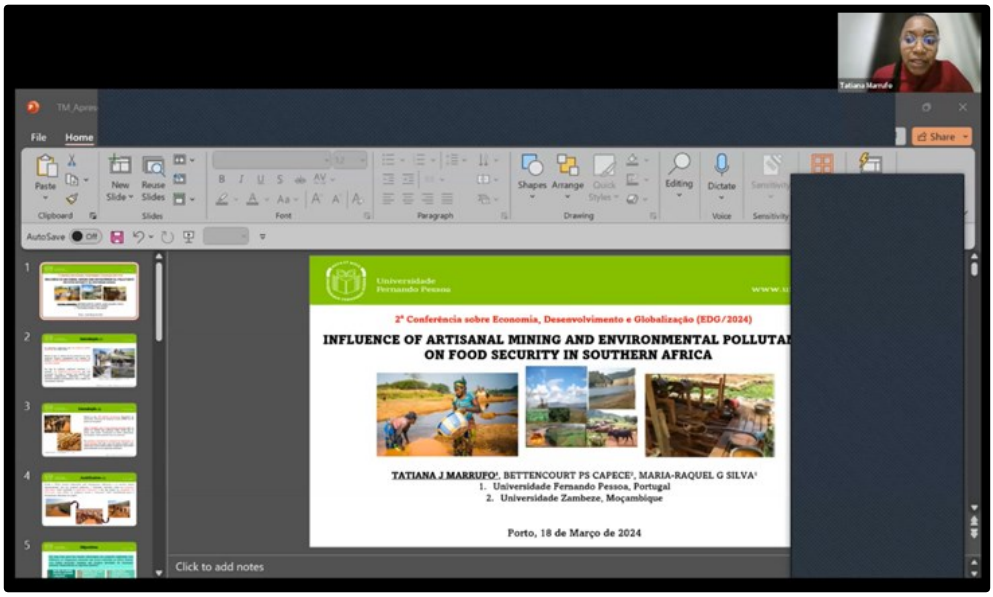

FOTO 24 – Tatiana J. Marrufo

ARTIGO SEM REVISÃO CEGA POR PARES

O artigo que se segue não foi sujeito ao processo de dupla revisão cega por pares

PAPERS WITHOUT BLIND PEER REVIEW

The following article has not been subjected to the double-blind peer review process.

ECONOMIC DEVELOPMENT VS SUSTAINABILITY, RESEARCH & DEVELOPMENT – A CONTRIBUTE FROM HEALTH PSYCHOLOGY

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***Keywords*:** Sustainability, Ecosystem development, Resilience, Hope, Health Psychology

Over recent decades, research has highlighted the critical impact of certain activities stemming from research and development projects on ecosystems, posing risks to human health and well-being. Economic development initiatives, though aiming to benefit communities, have often proven unsustainable and have contributed to ecosystem degradation and species endangerment. In fact, the resilience of ecosystems and its functions can be compromised, through (in)direct impacts, by humans and environmental stress, intensifying the risks and threats to human health and well-being. Urgent awareness-raising is necessary, but it's essential to recognize potential negative impacts on health, namely mental health. Therefore, identifying and promoting mental health protective factors becomes crucial.

This narrative review aims to explore literature on the relationship between ecosystem degradation and health, as well as resilience and hope, as these factors play significant roles in safeguarding human health and well-being. It is crucial to consider the evidence supporting environmental action, not only because of its positive impact on human health and welfare, but also its potential to generate economic benefits by enhancing the sustainability of economic development.

Ecossystems' degradation and health

In distant 1998, Rapport, Costanza, and McMichael reviewed the relationships between human activities/ecosystems' degradation and risks to health and stated that "population health becomes an important criterion of sustainability – one that, over time, signals whether we are satisfactorily sustaining the social and ecological realms" (Rapport, Costanza, & McMichael, 1998, p. 398).

In this line, Dhiman (2022) presented how ecosystem restoration, encompassing a vast array of activities, allows one to improve the relationship with the ecosystems one depends on and how to protect biodiversity for future generations.

Human over-exploitation of natural resources/ecosystem degradation had a role on the spread of COVID-19 cases; lockdowns lead to several positive ecological consequences and difficulties, as well as indicators that some pre-lockdown level of human activities might not be reached again (Castelli et al., 2023; Guo & Lee, 2022; Srivastava et a., 2021). Complementarly, a systematic review of the literature on the linkages of COVID-19 with environment, revealed a critical role of meteorological factors, ambient air pollutants and wastewater in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission-spread dynamics and direct and indirect (positive and negative, long and short-term) impacts of COVID-19 (Weaver, Head, Gould, Carlton, & Remais, 2022).

Urban and agro-ecosystems, representative of human-coupled ecosystems, are natural, social-economic, complex ecosystems playing a central role in human life; in fact, the disturbances or stresses that act as the drivers of change in ecosystems can be categorized as natural and anthropogenic, which interact over time, and anthropogenic drivers may result in a wide range of changes to ecosystems, but because humans live within or close to the ecosystems they affect, these drivers get substantial feedback from ecosystems (Lu et al., 2015).

The resilience of ecosystems and the functions they maintain are compromised through (in)direct impacts of humans and environmental stress, with human-induced climate change and ongoing ecosystem degradation intensifying the risks and threats to human health and well-being (Lu et al., 2015; Pappaioanou & Kane, 2023; United Nations Environment Programme, 2000). Additionally, medical research and clinical practice have exposed that there are "miniature" ecosystems within human bodies, whose deterioration causes several severe health problems (Aronson, Blatt, & Aronson, 2016).

Müller et al. (2023) defended individual sustainability transformations and believed that humans need help to see nature as equal, so they explored the concept of individual human–nature resonance and presented an operationalization for transformative rituals (enhanced by psychology and psychotherapy), namelly a 5-week ritual fostering individuals to turn inwards and commit to live according to planetary requirements.

It is important to stress there is evidence that makes the environmental case for action, considering its benefts for human health and welfare, and that it can generate economic returns in terms of productivity, jobs and income and reduce the costs of meeting any emissions and resource use targets (Ekins & Zenghelis, 2021).

Hope

Su, Huebner, and Tian (2023) recruited 637 students from two elementary schools in a city in south China (age: *M*=9.01 years, *SD*=0.75), which were assessed on six occasions across three years, with six-months assessment intervals. Within and across waves, hope, basic psychological needs satisfaction at school, and depressive symptoms were significantly correlated to each other. Moreover, children exhibiting above-average levels of hope during one assessment were found to be less prone to experiencing depressive symptoms during the subsequent assessment, irrespective of their depressive symptom's levels during the preceding assessment. Contrariwise, those with higher-than-average scores in depressive symptoms were more inclined to report lower levels of hope. This suggests that hope not only serves as a protective factor against depressive symptoms in children but can also be influenced by such symptoms. Furthermore, the level of hope among schoolchildren seems to correlate with their satisfaction of psychological needs within the school environment, potentially reducing their depressive symptoms. In the academic year of 2017-18, Ahmadi and Ramazani (2020) assessed 324 students of Farhangian University in Zanjan province, Iran, and reported a significant correlation between hope and its components and psychological well-being and its components and that hope predicted the sample's psychological well-being.

During COVID-19, Sarker, Sugawara, and Nishad (2022) conducted an assessment involving 498 tertiary college students from Rajshahi district, Bangladesh, aged 19 to 31 years (M=22.03, SD=1.92). Their findings revealed a positive correlation between hope, fear of COVID-19, and mental health. Additionally, they found that hope served as a mediator in the relationship between fear of COVID-19 and mental health: a lower level

of fear of COVID-19 was associated with increased levels of hope, subsequently enhancing mental health.

Furthermore, Tee, Shah, Ramis, and Jia-Qi (2022) examined 152 Malaysians facing economic challenges from the COVID-19 pandemic, with a mean age of 29.69 years. They found that a specific way of defining hope, known as locus-of-hope, was a significant predictor of well-being, even more so than general optimism. Among the four aspects of locus-of-hope, internal hope and family-related external hope were the most influential in predicting well-being (vs. external-peers and external-spiritual).

Ding et al. (2021) compared anxiety and depression symptoms during the COVID-19 lockdown among 13,263 adults (62.8% female; 51.7% 18–34 years old) from 11 countries (Brazil, Bulgaria, China, India, Ireland, North Macedonia, Malaysia, Singapore, Spain, Turkey, United States), between June and August 2020. Substantial variations in anxiety and depression symptoms were found across countries (e.g., Brazil had the highest symptoms and Singapore the lowest), with personal COVID-19 exposure being a significant risk factor. There were also considerable variations in hope. Higher levels of hope were associated with reduced anxiety and depression.

Resilience

Between 2014-2016, Hildebrand, Celeri, Morcillo and Zanolli (2019) studied 166 pairs of children/adolescents (9-16 years) and those responsible for them. Of these children/adolescents 100 had suffered domestic violence (neglicence or physical, psychological or sexual violence) and were attended in specialized services in Brasil (G1). The remaining 66 were students of schools located in the same regions of G1, with no reported domestic violence (G2). They found that: the prevalence of resilience of both groups was similar. There was no difference in the prevalence of resilience between Group 1 and Group 2. However, a low perception of social support was linked to a higher likelihood of low resilience. Participants from both groups with low resilience were more likely to experience mental health problems, although this association was not evident for all the indicators studied.

Konaszewski, Niesiobędzka, and Surzykiewicz (2021) reported two studies focusing on resilience and (positive and negative indicators of) mental health of juveniles admitted to youth educational centres throughout Poland (i.e., who were demoralised or had committed punishable acts): 201 (13-18 years, *M*=15.71, *SD*=1.29) and 253 (13-18 years, *M*=16.34, *SD*=1.16). In study 1, the resilience of the sample was considered

average. Resilience was found to have a positive and significant correlation with life satisfaction, while it was negatively and moderately related to the risk of depression. Regression analysis showed that resilience was a significant predictor of life satisfaction and that the only significant predictor of depression was resilience. In study 2, resilience emerged as a significant contributor to mental well-being, serving as a direct predictor. Specifically, resilience demonstrated positive correlations with active coping, seeking support from others, avoidance, and coping through religion. Conversely, resilience displayed negative correlations with coping through the discharge of negative emotions and the use of psychoactive substances. Notably, no significant relationship was found between resilience and humour. The seeking of support from others and coping through emotions were identified as mediators in the association between resilience and mental well-being.

Rudwan and Alhashimia (2018) studied 1000 Omani university students (18->30 years), in the 2016/2017 academic year, and found a positive and statistically significant correlation between resilience and mental health, with resilience predicting mental health. In 2021, Al Omari et al. (2023) collected data among 676 Omani university students (age: *M*=20.77 years): 45.3% had low resilience, 49.3% normal resilience, and 5.5% high resilience. In addition to other discoveries, the authors noted a significant link between resilience and regular sleep, perceived stress, well-being, and self-esteem.

Wu, Sang, Zhang, and Margraf (2020) assessed the same 314 university students in China three times: September 2012 (T1 – *N*=1064 freshmen participated; 17-21 years, *M*=18.23, *SD*=0.76), September 2014 (T2 - *N*=695 juniors), and September 2015 (T3 - *N*=497 seniors). They were pioneers in investigating the reciprocal relationship between resilience and mental health status across three phases spanning four years, employing cross-lagged panel analysis within a sample of university students. Across the three surveys, the pairwise correlations among depression, anxiety, stress, and resilience consistently showed significant negative associations, with the exception of resilience at T1 and stress at T2. Conversely, across all three surveys, the pairwise simultaneous and successive correlations between resilience and positive mental health consistently exhibited positive and significant relationships. The analyses unveiled a noteworthy reciprocal association between resilience and mental health, demonstrating that resilience forecasted mental health in the short term (1 year), and conversely. However, over the longer term of 2 years, mental health was predictive of resilience. Notably, within this 2-

year period, spanning from freshman to junior year, the predictive role of resilience for mental health was not significant. More precisely, the findings indicate a correlation between enhanced mental health and heightened resilience. The authors highlight a chain effect in which mental health appears to influence resilience, while resilience additional affects mental health.

Afek et al. (2021) studied 138 Israel Defense Forces soldiers during their basic combat training, between 2018 and 2019 (18.1–21.6 years, *M*=19.05, *SD*=0.57). The majority revealed moderate to high resilience, with the average levels of the participants significantly higher than the normal population score. No significant correlations were found between resilience and any of the mental health scales, including psychological distress and anxiety. Resilience demonstrated a connection with non-emotional inhibitory control but not with emotional inhibitory control. Additionally, resilience exhibited a correlation with sustained attention in the non-emotional task.

Hope & resilience

Sun, Yu, Wu, and Ma (2023) collected data in 2020, from 1776 students in a senior high school in Northwest China, where there was no COVID-19 outbreak at the time (age: male – *M*=17.94 years, *SD*=1.32; female – *M*=17.77, *SD*=1.29). Hope and resilience exhibited significant positive correlations, and both were also significantly and positively associated with mental health. Additionally, hope significantly and positively predicted both resilience and mental health. Moreover, resilience acted as a mediator between hope and mental health.

However, hope and resilience are not solely considered in the context of mental health. In fact, having found no research on the role of hope and resilience on dietary behaviors in the situations of mental load associated with pandemics, Sińska, Jaworski, Panczyk, Traczyk, and Kucharska (2021) studied 1082 adult Polish inhabitants (age: *M*=31.6 years, *SD*=11.98) in April and May 2020 (a period of sudden changes in lifestyles related to the lockdown - 12 March–20 April 2020). The value of the Dietary Guidelines Adherence Index varied depending on the psychological profile of the participants. Those who exhibited a capacity to cope with challenges and adapt swiftly to changing circumstances demonstrated the highest adherence to principles of proper nutrition. The combination of fundamental hope and strong resilience played a role in the adoption of dietary behaviors consistent with recommendations.

Using a different approach, Laranjeira, Querido, Charepe and Dixe (2020), after undertaking an integrative review of literature published between 2009-2019, indexed in b-On, EBSCO, PubMed, Medline, ISI, SciELO, PsycINFO, and Google Scholar, concluded that most hope-based interventions for people with chronic diseases were applied individually or in groups over 4-12 sessions of 0.5-2h each, and promoted coping and emotional adjustment, enhanced quality of life, was essential in spirituality/purpose in life and illness, improved self-esteem, and was an important factor in resilience.

Conclusions

The interconnectedness between ecosystem degradation, human health, and well-being underscores the imperative for sustainable practices and environmental stewardship. The health of populations serves as a vital indicator of sustainability, emphasizing the intricate balance between social, ecological, and human realms.

Efforts such as ecosystem restoration offer pathways to mitigate ecosystem degradation and protect biodiversity for future generations. The COVID-19 pandemic, while disruptive, has also unveiled the ecological benefits of reduced human activity, prompting reflection on the sustainability of pre-pandemic lifestyles. Ecosystems, central to human existence, face multifaceted pressures from both natural and anthropogenic drivers, necessitating a holistic approach to ecosystem management. Furthermore, the intricate relationship between human health and ecosystems extends to the microcosm of the human body, underscoring the need for holistic health perspectives. Among these challenges, individual and collective resilience emerge as crucial buffers against environmental stressors and mental health adversities. The positive correlation between hope, resilience, and mental well-being underscores their potential as protective factors in diverse contexts, from academic settings to crisis situations like the COVID-19 pandemic. Moreover, interventions targeting hope and resilience show promise in enhancing coping mechanisms, promoting healthy behaviours, and improving quality of life for individuals facing chronic illnesses. As humanity navigates the complexities of environmental sustainability and global health challenges, fostering hope, resilience, and sustainable practices emerge as essential pillars for safeguarding both human and planetary well-being.

The juxtaposition of economic development and sustainability, as well as the role of research and development, offers valuable insights from the perspective of health

psychology. This interdisciplinary approach contributes to understanding how economic activities impact health and well-being, and how sustainable practices can be integrated into economic development strategies, prioritizing human health and environmental well-being.

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ARTIGOS COM DUPLA REVISÃO CEGA POR PARES

Os artigos que se seguem foram sujeitos ao processo de dupla revisão cega por pares

ARTICLES WITH DOUBLE BLIND PEER REVIEW

The following articles have undergone a double-blind peer review process.

ECONOMIC IMPACTS OF ARTISANAL MINING AND ENVIRONMENTAL POLLUTANTS ON FOOD SECURITY IN SOUTHERN AFRICA: A Review

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Abstract

Introduction: Environmental pollutants, including those from mining activities, have become a significant global problem, contributing to millions of deaths and economic losses worldwide, while posing challenges in occupational, environmental, and social domains. This issue is also a public health concern that impacts food security and, consequently, people's health.

Objectives: This paper aims to analyze the economic impact of environmental pollution from mining activities on food security in the Southern Africa region.

Methodology: Published articles available in electronic databases (PubMed, SciELO, ScienceDirect, and Google Scholar) from 2013 to 2023 were reviewed. The selected publications met the inclusion criteria, and the data were analyzed and synthesized into themes of interest.

Findings: This region faces food insecurity despite its richness in natural resources. Artisanal mining is the main economic activity in some areas. The review highlighted mercury as the most used metal in artisanal mining, which has negative environmental impacts that affect agriculture and contribute to food insecurity. Gold is the primary commodity extracted in artisanal and small-scale gold mining (ASGM), significantly influencing economic wealth.

Conclusions and recommendations: Environmental pollution from artisanal mining has adversely affected agriculture and food security in Southern African communities. It is recommended to implement strategies to prevent environmental pollution in small communities where mining activities have a significant impact

Keywords: *artisanal mining, environmental pollutants, food security, economy, Southern Africa*

Introduction

Environmental pollutants have emerged as a global problem in the 21st century, with estimates suggesting that their pathways and effects are contributing to millions of deaths and economic losses worldwide (Entwistle et al., 2019). Among the relevant types of environmental pollutants are chemicals derived from mining activities around the world, which are causing health concerns in affected communities. These activities pose challenges in occupational, environmental, and social domains (Awomeso et al., 2017; Dietler et al., 2021). It is estimated that 150 million people depend on artisanal and small-scale mining (ASM) across 80 countries in the global south, with the African continent being the major contributor to this activity. In this region, global natural resources such as minerals and metals are extracted from some of the poorest countries (Cossa et al., 2022; Dietler et al., 2021; Minerals, 2018).

As artisanal and small-scale mining (ASM) activities continue to grow in many resource-endowed countries in the African region, revenues serve as a precursor to socio-economic growth, especially in mineral-rich rural communities. Despite bringing a wealth of socio-economic benefits, ASM also has particularly destructive effects on the environment, compromising its role as a key factor in sustainable livelihoods and contributing to sustainable development (Hilson & McQuilken, 2014; Ofosu et al., 2020).

Anthropogenic activities lead to environmental pollution through mining discharge and leachates into soils and aquatic environments, becoming a public health concern and affecting food security and, consequently, people's health and nutritional status (Cossa et al., 2022; Jayakumar et al., 2021; Kortei et al., 2020). Heavy metals are the most studied commodities resulting from mining discharges in water, soil, sediment, food, and air (de Souza et al., 2017; Gbogbo et al., 2018; Magwedere et al., 2013; Mambrey et al., 2020;

Mataba et al., 2016; Singo et al., 2022; Wang et al., 2017). However, there is still a lack of understanding of the impacts they may pose on food safety (Cossa et al., 2022; Dietler et al., 2021; Jayakumar et al., 2021).

Thus, it is relevant to understand how environmental pollutants are affecting food safety and how ASM activities are contributing to overall food insecurity in Southern Africa. This region is extremely rich in natural and metal resources (Azadi et al., 2022; Cossa et al., 2022; Govender et al., 2021; Jayakumar et al., 2021; Marcantonio, 2018; Saulick et al., 2017).

This paper aims to provide insights into environmental pollutants studied in economically impacted countries of Southern Africa due to artisanal mining activities, which influence food insecurity. The paper will review relevant topics studied in the region such as: (i) the economy and artisanal mining sector; (ii) environmental pollutants over the past decade; (iii) vulnerable groups exposed in mining settings; (iv) food insecurity and artisanal mining; and (v) paths and solutions for sustainability.

Methodology

A peer-reviewed literature search (Levac et al., 2010) was conducted in duplicate to identify all available articles from 2013 to 2023. Publications were selected from databases (PubMed, ScienceDirect, SciELO, and Google Scholar) based on titles and abstracts, according to the following inclusion criteria: 1) studies specifically on artisanal mining in the Southern Africa region, 2) effects on agriculture and the environment, 3) impacts on social and economic domains, and 4) effects on food security. A descriptive and thematic approach was used to characterize and synthesize the content of the included articles.

Economy and artisanal mining sector

Artisanal and small-scale mining and economic development

Worldwide, around 150 million people across 80 countries in the global south depend on ASM activities, of which 40 million are workers. In the African continent alone, 54 million people depend on this activity, with an estimated 9 million ASM operators.

Southern African countries have vast potential for mineral resources that drive socioeconomic development and contribute to Gross Domestic Product (GDP)(Mozambique, 2023; Wilson et al., 2015). This sector has shown positive performance due to increased capabilities and the liberalization of mining companies in these countries. Among the minerals explored, gold has demonstrated an increase in annual production and revenues, contributing significantly to the countries' GDP. For example, in Mozambique, gold production recorded a growth of 65.3% in 2022 compared to 2021(Mozambique, 2023).

Seccatore et al. (2014) state that in 2013, The Global Mercury Assessment (UNEP) estimated that ASM of gold released approximately 727 metric tonnes of mercury (Hg) into the environment per year, representing 37% of the global 1960 tonnes of Hg released annually by anthropogenic sources into the environment.

At the microeconomic level, Artisanal and Small-Scale Gold Mining (ASGM) brings benefits to individuals, both miners and their families, driven by the need to generate cash for daily life needs such as food, children's education, healthcare, clothing, and shelter, all important components of the Millennium Development Goals (MDGs). In Southern Africa, this activity is seen as an alternative source of income, especially given high levels of unemployment and poverty, making ASGM a primary means of survival for many participants (Wilson et al., 2015).

Although Wilson et al. (2015) present ASM as the backbone of some local economies facilitating the development of complementary, sustainable, revenue-generating activities, and serving as a source of finance for local investors to run their small businesses, it remains challenging to formalize and establish more extensive registration programs for ASGM, or for governments to encourage alternative, sustainable, and realistic livelihood options that could be easily accepted by miners.

Thus, it is relevant across the region for policies and strategies to emphasize the importance of managing and exploiting resources in a sustainable and transparent manner to raise living standards for African populations and future generations.

Challenges posed

Apart from the previously presented benefits of ASGM, in many African settings, this activity may lead to a decline in income. This is because people tend to invest time and

money in purchasing equipment without obtaining sufficient gold profits. This represents not only a risky business but also a context-dependent one, as gold-bearing rock is not evenly spread among men and women in the community. Consequently, there is no guarantee that poverty could be reduced (Wilson et al., 2015). Malone et al. (2023) point out that in ASGM settings, one important challenge is to reduce mercury use, taking into consideration the Minamata Convention. However, this requires negotiations with miners to ensure that realistic solutions align with their capabilities and strengths, prioritizing the miners' fundamental economic interests. This could be achieved by properly supporting and following up with them, rather than using an enforcement-driven approach that could push the sector further into shadow economies.

In South Africa, another documented challenge highlighted in Mhlongo et al. (2019) is the issue of abandoned mines, such as in the Sutherland goldfield. This forces people to engage in ASGM activities, leading to socio-economic issues within the communities around the abandoned mines, particularly in reversing efforts to clean up environmental hazards like abandoned mine shafts. At the individual level, the use of child labor implies reduced school attendance, which is likely to limit opportunities for future economic improvement in that community(Wilson et al., 2015).

In general, addressing the diverse economic impacts of ASGM is challenging as it involves deciding which various metrics to use, at what societal level they occur and function, and how to measure and evaluate the direct and indirect pathways of influence (Wilson et al., 2015).

Opportunities raised

According to Wilson et al. (2015), ASGM creates significant economic opportunities and benefits. For instance, women engage in this activity to raise capital for starting businesses. This allows them to transition away from gold mining work, which they perceive as endangering their health, and move back to urban centers. They are directly involved in generating income for themselves and their families. Across Africa, ASGM shares crucial economic drivers that transcend cultural, ecological, geographical, and political differences, despite potential variations among subcultures and environments.

In the policy domain, developing regulations and policies can contribute to the long-term impacts of ASGM, including poverty reduction at the community level. This presents opportunities in the Southern Africa region to establish interactions across social,

environmental, and economic domains. These interactions aid in defining and implementing appropriate policies and actions at various spatial and temporal scales (Wilson et al., 2015).

Environmental pollutants of the past decade

Over the past decade, studies in the Southern Africa region have focused on environmental pollutants, addressing exposure to biological, chemical, and physical contaminants (Bentley & Soebandrio, 2017; Gbogbo et al., 2018; Green et al., 2019; Male et al., 2013; Mataba et al., 2016; Nyanza et al., 2014). These studies investigated a variety of commodities in terms of environmental pollutants in water, soil, and food, as well as in human samples such as blood, urine, and hair (Mambrey et al., 2020; Mataba et al., 2016; Nyanza et al., 2014).

The impacts of ASM tend to increase environmental hazards due to the informal and uncontrollable nature of the activity. This is exacerbated by the composition of the areas, increasing the solubility of contaminants, and making them more available for plant uptake, potentially entering the food chain with associated effects (Adesipo et al., 2020). Furthermore, ASM regions, with associated gold waste deposited on the ground surface and later used for cultivation after abandonment, lead to increased gold waste contaminants such as heavy metals like Lead, Copper, Cadmium, Iron, Mercury, Arsenic, and Zinc.

Studies conducted from 2013 to 2023 (Bisimwa et al., 2022; Kayembe-Kitenge et al., 2020; Muimba-Kankolongo et al., 2022; Muimba-Kankolongo et al., 2021) addressed food safety by investigating chemical pollutants (heavy metals) in environmental (water and food) and human samples (blood and urine). In Botswana, the country with the lowest registered ASM population in 2014, studies (Ditlhakanyane et al., 2022; Eze et al., 2020) investigating chemical pollutants (heavy metals) in soil and plants, also related to food safety. Physical pollutants were poorly assessed in the region, with a study conducted in Mozambique (Carvalho et al., 2014) being related to radiation exposure of workers in mining facilities.

Vulnerable groups exposed in mining settings

Occupational hazards in the mining sector have received significant attention and seen advancements in risk reduction efforts in some areas over the past decade. However,

effective health interventions for miners regarding occupational exposures in this sector are still lacking (Tsang et al., 2019). Studies on mercury exposure have been a primary focus among these investigations, along with other toxic substances such as lead and arsenic. Additionally, concerns have been raised about hygiene and sanitation, the rise of sex workers, and associated reproductive health problems in mining communities.

While there is a focus on workers in ASGM, other relevant subgroups that are not occupationally involved in the activity, such as family members and residents in mining areas, may also be affected by mercury exposure. Exposure occurs across all age groups due to large quantities of semi-volatile elemental mercury released into the air in crowded neighborhoods without emission controls, as well as gold shops regularly burning off mercury into residential streets in towns and cities (Steckling et al., 2014).

Studies investigating health in female and child subjects within specific subgroups, such as pregnant women, women near delivery, or children under 18 months old, do not assess their nutritional needs. However, it is particularly relevant to focus specifically on children due to the potential damage to their neurological systems from chronic exposure to toxic mercury (Steckling et al., 2014).

Food insecurity and artisanal mining

ASM activities result in environmental degradation due to extensive excavation and waste contamination, which can lead to human health problems not only for miners but also for their families and communities (Tsang et al., 2019). This environmental impact from mineral extraction damages productive sectors like agriculture by affecting water and land resources, thus hindering human development through the degradation of natural resources such as water and land (Galli et al., 2022).

One potential mechanism linking artisanal mining to food safety is that alluvial mines need to be located near rivers, benefiting from fertile alluvial silt, which can impact fisheries due to their proximity to river reaches. Additionally, metal leakages increase turbidity, which can lower fish productivity, reduce stocks, and make catches more difficult (Galli et al., 2022).

Barenblitt et al. (2021) demonstrated the causal relationship between artisanal mining and low food production, with farmland being lost to mine conversion areas in mining communities. In these areas, agriculture and poverty play key roles in the trend of

decreasing small-scale agriculture, negatively impacting the economy. In Southern Africa, the environmental richness, and the increased rate of artisanal mining in the past decade have major implications for economic wealth and the future of agriculture and food security (Barenblitt et al., 2021; Galli et al., 2022).

Path and solutions to sustainability

ASM activities are still growing in the continent and the region, prompting an urgent call for solutions to minimize their impacts at various levels. This is crucial for ensuring the sustainability of the activity and its contribution to the country's overall economy. A path to sustainable development has already been outlined by the Intergovernmental Forum on Mining, Minerals, (2018), which involves:

(i) Capacity building and partnerships; (ii) Organizing miners through cooperatives and associations; (iii) Collaborating with large-scale mining companies to benefit from capacity building; (iv) Improving miners' access to efficient and cleaner technologies; (v) Benefiting from capital to support their overall activities.

In Mozambique, some solutions outlined in the Extractive Industry Statistics Report (Mozambique, 2023) include optimizing mineral production, adding value to mineral resources, promoting the participation of the national cooperative and associative private sectors, granting preference to nationals in identifying economically valuable mineralized bodies, promoting gender equity, and ensuring institutional development.

For the success of these solutions, Southern African countries should enhance their multisectoral collaboration in this domain. This includes the social, environmental, health, and economic sectors working together to jointly implement activities that could ultimately benefit the sustainability of future generations. This collaborative effort aims to minimize the risks and hazards associated with ASM activities at all levels.

Conclusions

Environmental pollution from mining activities in Southern Africa leads to reduced food production due to water and land contamination. This decline in agricultural productivity has significant implications for food security, with serious concerns for the economy and human health.

While the rise in mining activities provides an important source of income and economic subsistence for local and rural communities where poverty and unemployment are prevalent, the resulting environmental pollution is causing unprecedented harm to agriculture and fisheries, negatively impacting food security and the overall health of the region's population.

Recommendations

There is a crucial need for investment in science and research across all countries in the region to address environmental and health challenges in mining settings. This includes the implementation of cleaner mining technologies, environmental monitoring programs, sustainable agricultural practices, and policies. Swift and effective measures should be taken to mitigate the impacts of artisanal and small-scale mining (ASM) activities and other environmental hazards on food security and human health.

Future research should focus on the diverse environmental hazards to which ASM communities are exposed, emphasizing pathways of human exposure to pollutants, particularly among the most vulnerable groups. The worsening food insecurity in Africa, exacerbated by factors such as ASM and environmental hazards, poses a significant challenge to achieving global sustainable development goals

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TEORIA DA MENTE EM CRIANÇAS COM PERTURBAÇÃO DO NEURODESENVOLVIMENTO: UM OLHAR SOBRE A PHDA E A PEA

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RESUMO

A Teoria da Mente (TM) é uma competência cognitiva social, uma vez que, avalia a nossa capacidade para reconhecer/atribuir os estados mentais, bem como o dos outros com o objetivo de predizer e explicar o comportamento. Vários estudos demonstram que as crianças com perturbação da hiperatividade e défice de atenção (PHDA) e crianças com perturbação do espectro do autismo (PEA) apresentam algumas alterações na TM quando comparadas com outras crianças sem problemas de desenvolvimento (SPD).
O objetivo deste estudo foi comparar a TM em três grupos: crianças em idade escolar com PHDA, crianças em idade escolar com PEA e crianças em idade escolar SPD.
Realizou-se um estudo observacional transversal. A amostra é composta por 42 crianças com idades entre os 6 e os 10 anos de idade: 15 com PHDA, 12 com PEA e 15 crianças SPD. A TM foi avaliada através da prova de avaliação Tartaruga da Ilha, Bateria de Avaliação de Funções Executivas em Crianças.
Observou-se diferenças significativas entre os grupos com PHDA e PEA quando comparados com o grupo SPD.
A avaliação com a TM permitiu revelar alterações significativas nesta habilidade cognitiva em crianças com PHDA e PEA, sendo um contributo no âmbito da Psicologia da Saúde.

Palavras-chave: TM; Desenvolvimento neurocognitivo; Funções executivas; PHDA; PEA.

I. INTRODUÇÃO

A Teoria da Mente (TM), pode ser entendida como uma etapa fundamental do desenvolvimento sociocognitivo normativo e emergente em idade pré-escolar. Por conseguinte, apresenta-se como a capacidade para compreender e atribuir estados mentais – caraterizados como desejos, cognições, crenças e emoções – a si e aos outros. Esta capacidade permitirá, à criança, prever e interpretar o comportamento dos outros (Apperly, 2012; Astington & Barriault, 2001; Coelho et al., 2023).

Em suma, vários autores reportam que essa capacidade de compreender os estados mentais dos outros e de si mesmo é uma das competências sociais do ser humano e, quando presente, permite interpretar como se reveste o desenvolvimento da criança (Coelho et al., 2023; Happé et al., 2013; Osorio et al., 2011; Sahin et al., 2018; Wellman, Cross, & Watson, 2001).

Muitos estudos têm sido realizados recorrendo à TM, estando os mesmos assentes na presença de contos infantis, onde um determinado personagem apresenta um

comportamento contrário àquilo que é expetável ou que apresenta uma crença diferente da realidade, estando presente o paradigma da falsa crença (Bora et al., 2016; Buitelaar et al*.,* 2011; Carlson et al*.,* 2004; Downs, & Smith, 2005; Lavigne et al*.,* 2020; Miranda et al., 2013; Osorio et al., 2011; Pineda-Alhucena et al., 2018; Wellman, Cross, & Watson, 2001).

Assim, as investigações têm verificado, em crianças em idade pré-escolar, que a TM, enquanto etapa desenvolvimental fundamental e normativa, está relacionada ao construto de crença falsa (Bora et al., 2016; Buitelaar et al., 2011; Carlson et al., 2004; Downs, & Smith, 2005; Lavigne et al., 2020; Miranda et al., 2013; Osorio et al., 2011; Pineda-Alhucena et al., 2018; Wellman, Cross, & Watson, 2001). Por conseguinte, assume-se que prever corretamente o comportamento da personagem implica, da parte da criança, a capacidade para pensar sobre os estados mentais enquanto representações, isto é, meta-representar (Kana et al., 2015; Perner, 1995) e descentrar-se da sua própria perspetiva para que consiga responder de acordo com aquilo que a personagem acredita ser a realidade (Wellman, Cross, & Watson, 2001). Dentro desta perspetiva assume-se, que crianças em idade pré-escolar são, de uma forma geral, bastante competentes neste tipo de tarefas, permitindo-lhes, desta forma, uma compreensão das crenças enquanto representações da realidade que, como representações que são, podem ser falsas (Kana et al., 2015; Wellman, Cross, & Watson, 2001).

Perante o exposto, a TM apresenta-se como uma capacidade cognitiva social, pois permite avaliar a nossa capacidade para reconhecer/atribuir os estados mentais, bem como o dos outros, com o objetivo de predizer e explicar o comportamento (Devine et al., 2013; Pérez-Vigil et al., 2024; Osorio et al., 2011).

Muitas investigações, demonstram que as crianças com perturbação da hiperatividade e défice de atenção (PHDA) e crianças com perturbação do espectro do autismo (PEA) parecem apresentar algumas alterações na TM quando comparadas com outras crianças sem problemas de neurodesenvolvimento (Abdel-Hamid, 2019; Bora et al., 2016; Buitelaar et al., 2011; Carlson et al., 2004; Downs, & Smith, 2005; Hollingdale et al., 2020; Ilzarbe et al., 2020; Lavigne et al., 2020; Maoz et al., 2019; Maoz et al., 2014; Miranda et al., 2017; Miranda et al., 2013; Osorio et al., 2011; Pérez-Vigil et al., 2024; Pineda-Alhucena et al., 2018; Tatatar, & Cansiz, 2022; Wellman, Cross, & Watson, 2001).

II. OBJETIVOS

- Procurou-se, no presente estudo, comparar, na população portuguesa, a Teoria da Mente de crianças em idade escolar em três grupos: crianças com Perturbação da Hiperatividade com Défice de Atenção, crianças com Perturbação do Espectro do Autismo e crianças sem problemas de neurodesenvolvimento.

III. MÉTODO

1. PARTICIPANTES

Realizou-se um estudo observacional e transversal. A amostra foi recolhida por seleção racional e por conveniência e é composta por 42 crianças com idades entre os 6 e os 10 anos de idade e com uma média de idades de 8,25 anos: 15 com Perturbação da Hiperatividade com Défice de Atenção, 12 com Perturbação do Espectro do Autismo e 15 crianças sem problemas de neurodesenvolvimento.

Tabela 1

Análise de dados sociodemográficos (género e idade) das crianças participantes do estudo

	n (%)		
	PHDA	PEA	SPN
Género			
Feminino	7 (46,7)	6 (50)	8 (53,3)
Masculino	8 (53,3)	6 (50)	7 (46,7)
Idade (média)	8,50	8,10	8,30

2. INSTRUMENTOS

Para avaliar a Teoria da Mente recorreu-se ao método de avaliação validada para a população portuguesa: Tartaruga na Ilha-Bateria de Avaliação de Funções Executivas em Crianças (Mesquita, 2011).

Esta prova é composta por um conjunto de provas que avaliam as funções executivas cognitivas (fluidez verbal, atenção, memória e planificação), as funções executivas emocionais (TM, ironia e tomada de decisões emocionais) e as funções executivas mistas. Em cada prova é possível obter uma pontuação independente e compará-la com o percentil correspondente para a idade.

Relativamente à avaliação da TM, é composta por três provas com diferentes níveis de complexidade, que se apresentam num formato de narrativa/história. A criança é convidada a seguir a sequência de eventos e procurando expor o que acha que acontecerá: (1) À noite: é a primeira prova e a menos complexa. Avalia a capacidade de entender o ponto de vista da criança (TM0); (2) O lanche: é a segunda prova e avalia a capacidade de entender o ponto de vista de dois sujeitos simultaneamente, comum e diferente (TM1); (3) O lanche 2: é a terceira prova e a mais complexa. Avalia a capacidade de perceber o que o sujeito sabe ou não sabe sobre o que personagem sabe (TM2) (Magno, 2016; Mesquita, 2011)

3. PROCEDIMENTO

Todos os participantes foram selecionados das consultas de Psicologia de uma unidade clínica – Clínica Dra. Rosa Basto - com o consentimento informado dos seus tutores legais. Dado tratar-se de um estudo piloto e dado que a informação clínica é confidencial e obedece aos requisitos essenciais de proteção dos dados, utilizou-se a informação recolhida para estudar a Teoria da Mente. Teve-se em consideração o princípio da autodeterminação, bem como, o respeito pela autonomia e privacidade tão fundamentais na investigação em Psicologia.

A seleção das crianças decorreu do acompanhamento psicológico de que são alvo por parte do Psicólogo/Investigador e com 5 sessões realizadas.

Relativamente às crianças diagnosticadas com Perturbação da Hiperatividade com Défice de Atenção foi pedido, aos seus tutores, a suspensão da terapia farmacológica com um intervalo de 24h antes do procedimento avaliativo e com a concordância do pedopsiquiatra que acompanha as crianças.

A aplicação da prova foi efetuada pelo Psicólogo/Investigador, que acompanha as crianças, e teve a duração média de 24 minutos.

Foram excluídos do estudo, crianças com outras comorbilidades, tais como perturbações psiquiátricas e do desenvolvimento, para além da PHDA e PEA, deterioração cognitiva e/ou déficits motores e/ou sensoriais.

Ficou claro e explícito que a orientação dos dados foi orientada em função da sua utilidade, ou seja, apenas se recolheram os dados necessários à própria investigação limitando desta forma a exposição de todos os participantes. Mais se acrescenta, que a utilização de dados de investigação é um processo de obtenção de dados legítimo e foi prevista em sede de consentimento informado a potencial utilização de dados. Neste sentido, apenas poderão ser reutilizados dados que estejam totalmente anonimizados, sem possibilidade de reversão ficando expresso que a reutilização de dados deve estar limitada a situações que mereçam um parecer positivo do Responsável pelo Acesso à informação (RAI) e/ou pelo investigador responsável pela recolha dos dados primários.

4. ANÁLISE DE DADOS

A análise estatística realizou-se utilizando o programa IBM SPSS versão 27. Ao aplicar a prova de Kolmogorov-Smirnov, observamos que os dados relacionados com a Teoria da Mente apresentavam una distribuição normal. Neste sentido, se realizou-se a análise estatística recorrendo à Análise de Variância, com um nível de significância de $p < 0,05$ para determinar se há diferenças significativas entre as médias de três ou mais grupos independentes.

IV. RESULTADOS

Na tabela 2, observam-se os valores médios devido à sua distribuição normal, pois consideramos ser um valor robusto para a presente análise. A tabela 1 apresenta os resultados correspondentes à média referente aos resultados obtidos pelos sujeitos distribuídos nos 3 grupos (PHDA, PEA e sem perturbação do neurodesenvolvimento). A pontuação total da TM refere-se à combinação total dos resultados das três provas.

Verifica-se, pela análise dos resultados, diferenças significativas nas três provas da TM, correspondendo, igualmente, à presença de diferenças significativas ($p<0,02$), ao nível das três provas (TMtotal) que compõem o instrumento de avaliação, nos grupos com

PHDA (M=98,00) e PEA (M=94,98) quando comparados com o grupo sem problemas de neurodesenvolvimento (M=116,89).

Por conseguinte, reconhece-se que o grupo SPN apresenta valores médios mais elevados em todas as provas da TM, ou seja, apresentam um melhor desempenho na avaliação efetuada.

Tabela 2

Pontuação de cada prova (TM0, TM1 e TM2) e a pontuação Total da Teoria da Mente (TMtotal) nos diferentes grupos

	Valor Médio			
	PHDA	PEA	SPN	*P*
TM0	98,65	96,27	119,00	0,001**
TM1	100,96	96,41	116,27	0,004**
TM2	94,41	92,27	115,41	0,000***
TMtotal	98,00	94,98	116,89	0,002*

*Nota. *p < 0,05, **p < 0,01, ***p < 0,001*

V. DISCUSSÃO

Dado o objetivo do estudo que procurava comparar, na população portuguesa, os resultados da TM em crianças com PHDA, PEA e com neurodesenvolvimento normal, o mesmo, permitiu observar diferenças nos grupos com e sem perturbação do neurodesenvolvimento.

Por conseguinte, verificaram-se diferenças significativas entre os grupos de crianças com PHDA e PEA relativamente ao grupo de crianças sem perturbação de neurodesenvolvimento, indo, estes resultados, de encontro ao objetivo do nosso estudo que pretendia comparar, na população portuguesa, os resultados da TM em crianças com idade escolar com PHDA, com PEA e com crianças sem perturbação do neurodesenvolvimento (Bora et al., 2016; Buitelaar et al., 2011). Não sendo um objetivo comparar os grupos com perturbação de desenvolvimento, os resultados apontam para que eles não apresentem diferenças significativas entre eles indo de encontro a vários estudos já desenvolvidos, que referem grande similitude nos domínios cognitivo e afetivo (Bora *et al.*, 2016; Buitelaar *et al.*, 2011; Coelho et al., 2023; Ilzarbe et al., 2020; Miranda et al., 2013). Não obstante o exposto, a literatura também refere que as crianças com PHDA apresentam menor controlo inibitório comparativamente com as crianças com PEA, que apresentam maiores dificuldades na flexibilidade cognitiva e na planificação (Coelho et al., 2023; Hollingdale et al., 2020; Ilzarbe et al., 2020; Miranda et al., 2017; Miranda et al., 2013; Pérez-Vigil et al., 2024), bem como na autorregulação com implicação direta na memória de trabalho e na regulação emocional (Pineda-Alhucema et al., 2018). Para além do exposto, outros estudos demonstram déficits na cognição social destas crianças utilizando a TM, que parece estar afetada em comparação com as crianças com neurodesenvolvimento normal, bem como, na presença uma relação entre as funções executivas e a TM no contexto da PHDA e PEA (Lavigne *et al.*, 2020; Carlson et al. 2004, Downs, & Smith, 2005; Maoz et al., 2019; Pérez-Vigil et al., 2024).

Grosso modo, dada as diferenças neurodesenvolvimentais de ambas as perturbações, PHDA e a PEA, elas apresentam semelhanças nos domínios cognitivos e afetivos, mas apresentam perfis particulares nas funções executivas e na TM (Maoz et al., 2019; Tatar, & Cansiz, 2022). Assume-se, igualmente, que as crianças com PEA e crianças com PHDA não compartilham um déficit subjacente comum de TM, apesar de muitas vezes compartilharem muitos dos mesmos problemas comportamentais (Hutchins et al., 2016).

Em futuras investigações, e como limitação do presente estudo, sugere-se replicar o estudo com amostras mais robustas de forma a analisar de forma mais expressiva, as diferenças observadas nestas crianças relativamente à TM. Mais se acrescenta, que os critérios de inclusão e exclusão também poderão influir nos resultados observados.

A própria suspensão da terapia farmacológica no grupo com PHDA por um período de 24 horas, poderá ser revista, pois a ação dos psicoestimulantes segundo Rubia e colaboradores (2014) e Maoz e colaboradores (2014) promovem uma melhoria significativa nas funções executivas e, consequentemente, um melhor rendimento na Teoria da Mente.

VI. CONCLUSÃO

O presente estudo procurou demonstrar se haveria efetivamente diferenças significativas, no que toca à TM, nas crianças com diagnóstico de PHDA e PEA relativamente às crianças SPD. Dado tratar-se de um estudo piloto, onde se recolheu a amostra resultante do acompanhamento destas crianças pelo Psicólogo/Investigador, considera-se fundamental replicar o presente estudo numa amostra mais alargada e ponderar qual o tempo necessário para a suspensão da terapia farmacológica e se ela deverá ser suspensa.

Mais se acrescenta, que os nossos resultados têm implicações para a prática e podem ampliar os modelos atuais de cognição social em perturbações do neurodesenvolvimento, sugerindo-se o isolamento de aspetos variáveis de competência que predizem modelos específicos e testáveis para pesquisas futuras.

VII. REFERÊNCIAS

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A Comissão Organizadora
Prof. Doutor Carlos Rodrigues
Prof.ª Doutora Ana Campina
Prof.ª Doutora Sandra Bernardo

APPRECIATION

To all those who took part in this academic event, regardless of their role, please accept our congratulations.

This "*EDG-2023 - 2nd Conference – Economy, Development and Globalization 2024 Subject – Research & Development* " was possible, solely and only, because each of your participations.

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