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SCIENTIA ET HUMANITAS

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LETTER FROM THE EDITOR-IN-CHIEF

Scientia et Humanitas *is dedicated to showcasing exceptional scholarship from across the MTSU community, and this, the 16th issue of the Honors College's research journal, offers a set of papers as intriguing as it is prodigious. Submissions have been culled from an interdisciplinary call for papers and subject to a blind peer editing process. From the articles submitted, 13 have been chosen based on their demonstration of exceptional research, composition, and pertinence to the writer's field. Both graduate and undergraduate work has been represented.*

Our crop of articles reveals a wide range of scholarly pursuits and angles, revealing the plurlity of interests that abound in MTSU's academic environs. This year's contributors examine everything from media sensationalism to the cognitive relationships between music and language; from the pedagogical dimensions of narrative genres to 20th Century representations of women in literature. The coexistence of multiple interpretive lenses and research methods showcases the rich diversity of scholarship taking place in the MTSU community, where the sciences naturally coexist with the humanities, and research has direct relevance to the world outside the academy walls. Perennial questions abound: What is the role of the arts in education? How have the gains in women's cultural agency reoriented our understanding of history? How does pedagogy adapt to social trends and learning differences? To what extent does the media shape our discourse and behavior? In what ways does literature still uniquely allow us to consider what it means to be human?

It has been a delight as an editor to engage with the lively work taking place in this university. I want to thank my associate and assistant editors, who gave rigorous readings to submissions and aided in the selection process; to the readers, who have been there in clutch times to evaluate incoming submissions; to the journal's previous editor, Kylie Petrovich, who gave me a proper introduction to the layout of the journal, and lastly to Dr. Phillip E. Phillips, my dissertation advisor and academic mentor, without whom this journal, the honors college, and the university as a whole would be at a great loss..

Matthew P. Hutton

Editor in Chief

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**Winner of the Deans' Distinguished Essay award*

To Be Greeted with Cries of Hate: Albert Camus and the Tragic Impossibility of the Algerian Question*

Ethan Estes

ABSTRACT

The influential writer Albert Camus was born in French Algeria and maintained a close and controversial relationship with the territory throughout his life. Camus's political writings, often more obscure in popular imagination than his novels, sparked controversy in his time and beyond. As such, these writings have motivated intense scholarly debate over the morality and feasibility of the author's positions. Particularly, his simultaneous disavowal of colonial injustice but rejection of Algerian independence alienated him from the contemporary French Left, Algerian nationalists, and "patriotic" Frenchmen. By framing Camus's positions through a lens of passive colonial collaboration and subconscious bias, the seeming contradictions between the author's moral humanism and practical forbearance of French colonial occupation can be better understood. Tortured by the conflict in his homeland, Camus maintained, "Algeria is where I hurt at this moment, as others feel pain in their lungs," with complete sincerity.[1] His situation as a *pied noir*, or French settler in Algeria, added a layer of tragic impossibility to any position endorsing the expulsion of French settlers, but his conscience impelled him to reject, too, the brutality and systematic oppression of French authorities. This paper will show these feelings were a contradiction the author could never fully resolve and that still haunts his legacy today.

***Deans' Distinguished Essay Winner**

1. Albert Camus, "Letter to an Algerian Militant," in *Algerian Chronicles*, trans. Arthur Goldhammer (Cambridge, MA: Harvard University Press, 2013), 113. Note: This line is particularly personal to Camus, as he alludes to the effects of tuberculosis he had suffered since age 17.

"Le temps des colonialismes est fini, il faut le savoir seulement et en tirer les consequences."[2]

For a time, Albert Camus was the conscience of a generation. The anti-nihilistic philosophy the French-Algerian writer articulated in *Le mythe de Sisyphe*, his resistance to Nazi totalitarianism in occupied France, his opposition to all violence, the death penalty, colonialism, and Stalin's Communism all earned him a reputation as a sublime moralist in an age where the advent of nuclear weapons threatened to decimate humanity. But like anything else, this era would not last. Beginning with his decisive public break with Jean-Paul Sartre in 1952 and repudiation by Simone de Beauvoir, over both his anti-Communism and stance on Algeria, and ending with his period of silence in 1958, Camus's reputation was forever changed.[3] To some, he remained a voice of conscience. To others, the French left and Algerian nationalists especially, his opposition to Algerian independence blacklisted his name forever. Camus himself, constantly tortured by the moral dilemmas he was faced with, maintained a more ambiguous view toward his own virtue. Ultimately, the question comes down to why one man inspired such varied hatred and admiration. The only way to understand is to analyze what he wrote situated in context to determine exactly how Camus perceived colonialism and the problem of violence. Such a study provides no easy answers. Camus's complex condemnation, yet reformist acceptance, of colonialism seem to stand forever in contradiction yet reveal essential dimensions of the Algerian dilemma.

Camus was torn between a desire to criticize French colonial policy in his native Algeria and a desire to advocate against the removal of French settlers in the name of Algerian nationalism. Consequently, he has been heavily scrutinized, not just by the contemporary French left of his time, but by those studying the Algerian War. His critics have interpreted his politics and literature as little more than thinly-veiled colonial justifications, while others have praised his advocacy of "universal" values. The truth lies somewhere in between. Indeed, there is a robust, and often correct, tradition of critique led by Conor Cruise-O'Brien and Palestinian American academic Edward Said that calls into question some of the colonialist assumptions inherent in Camus's politics. Analysis will reveal the French Algerian author's sometimes misunderstood, at times subconsciously Eurocentric, and often thoughtful analysis to gain a better understanding of the complex forces at play in the Algerian conflict.

These forces cannot be apprehended, however, without first understanding that Camus wrote within the context of his time. To lend particularity to this context, it is worth noting a broad outline of dates and events that are important to the Algerian War and the debates surrounding it. May 1954, for example, is when the French suffered a grievous defeat at Dien Bien Phu in Indochina. This loss was notable because, for the colonized across France's colonial empire, the episode demonstrated beyond a doubt that French forces were not invincible nor were Europeans inherently better; armed resistance could break their will. It is no coincidence that 1954 is the same year the *Front de libération nationale* (FLN) launched the notorious *Toussaint Rouge* attacks in November, earning the original revolutionaries the name of *novembristes*.[4] These widespread attacks on French police and government in Algeria became known as the official start date of the "Algerian situation," the term French authorities used to inconspicuously refer to their war. These attacks did not emerge from nowhere through a process of spontaneous generation, however, but instead served as the culmination of nationalist unrest that had been incubating as systematic political, legal, and material injustices proliferated (see Figure 1).

In early 1955, Jacques Soustelle, a moderate reformist, was appointed governor-general

2. Albert Camus, *Actuelles III: Chroniques Algériennes*, 302–03; In English: "The time of colonialism is over; we must only know and draw the consequences."

3. Alistair Horne, *A Savage War of Peace: Algeria 1954-62* (New York: Viking Press, 1978), 235-236; Ronald Aronson, "Camus Versus Sartre: The Unresolved Conflict," *Sartre Studies International* 11, no. 1/2 (2005), 302-303, 305-306

4. The FLN was Algeria's revolutionary nationalist party.

of Algeria, but his plans were never implemented. He was sacked in February 1956. Also in 1955, the FLN staged the Philippeville massacres, a brutal campaign heatedly contested within the party leadership that targeted *pied noir* civilians. The attacks, a response to the French policy of collective responsibility, were violent and killed hundreds of Europeans. The French reprisals, however, overtopped the FLN's numbers by thousands. In 1956, Yacef Saadi began the Battle of Algiers when three women placed bombs at Air France, a milk bar, and a popular eatery for *pied noir ultras*.[5] In January 1957, Jacques Massu's *paras* took over Algiers, instituting a brutal military and torture campaign that ended the insurgency. In 1958, a crisis occurred in France whereby the Fourth Republic collapsed, the military nearly seized Paris, and Charles de Gaulle was returned to power, inaugurating the French Fifth Republic. Despite a prolonged terror campaign by the far-right *Organisation armée secrete* (OAS), which opposed Algerian independence, de Gaulle would ultimately initiate peace talks with the FLN. Talks lasted intermittently from 1960 until 1962, when the second peace talks at Evian resulted in the Evian Accords and French withdrawal from Algeria. That same year, the policy of the new Algerian state initiated both the expulsion of nearly all one million French settlers—remembered by the phrase *la valise ou le cercueil* (the suitcase or the coffin)—and reprisals against Muslims perceived as collaborators with the French. The tortured attempts of Camus to reason through this tumultuous and violent decade resound with the echoes of these calamities. The French-Algerian writer despaired to find a solution as one tragedy followed another in a war, like any other, with no happy ending.[6]

Figure 1

Decisive Legal and Political Occurrences in Colonial Algeria

Occurrence and Date	Description
1830	Agreement between the Dey (ruler of Regency of Algiers) and July Monarchy allowing natives to abide by Islamic rather than French law, despite the régime de sabre installed after conquest.
Constitution of 1848 (Decree of 4 March)	Made Algeria an integral part of the French métropole, dividing it into the three départements of Oran, Constantine, and Algiers.[7]
Sénatus-Consulte, 22 April 1863	Deconstructed the native land system and severely damaged tribal structures by subjecting Algerian land to privatization and European laws, resulting in the colonization of large tracts.
Sénatus-Consulte, 14 July 1865	A law propagated under Napoleon III designating Muslim Algerians as French subjects but not citizens unless they renounced their rights and duties under Islamic law. Remained in force until after WWII.[8]
Crémieux Decree, October 1870	Granted citizenship to Jews across the French Empire. This decree would be perceived as a source of injustice to Muslims still denied citizenship rights.

5. The term "ultras" referred broadly to virulently anti-independence or racist settlers who often joined militias or perpetrated acts of terror against native Algerians or the French government. See: Horne, A Savage War of Peace, 56, 148-49, 181-82, 299.

6. Horne, *A Savage War of Peace*, 568-569.

7. James McDougall, *A History of Algeria* (Cambridge, MA: Cambridge University Press, 2017), 103-04.

8. Michael Brett, "Legislating for Inequality in Algeria: The Senatus-Consulte of 14 July 1865," *Bulletin of the School of Oriental and African Studies* 51, no. 3 (1988), 441.

"*Code" l'indigénat*, 1881*	A loosely defined set of practices, rather than official law, the *regime l'indigénat* commonly included a lack of due process for "natives" (*indigènes*), arbitrary fines or imprisonment, and property confiscation. These regulations to control the colonized were codified in no single legal text yet came to be represented by a 28 June 1881 law that increased the power of administrators over natives.[9]
Blum-Viollette Plan, 1936	A moderate reform plan that would have granted political equality to a narrow class of Muslims. It was nonetheless fiercely protested and defeated by *pied noir* protests. This episode ended assimilationist aspirations, provoking moderates like Ferhat Abbas to become more nationalist.
Ordinances, 7 March 1944 and May 1946	The *indigénat* was ended, voting rights extended to male Algerians over twenty-one, and all Algerians were made citizens of the new French Union under the Fourth Republic.[10]
Statute of Algeria, 1947	Created the double electoral college system, whereby 532,000 European electors were granted political power equal to 1.3 million Algerian voters representing a population eight times larger than the *pied noirs*.[11]
Election Fraud, 1948	Algerian Assembly elections were effectively and blatantly rigged via arrests, ballot tampering, and military intimidation. Any remaining faith in electoral politics was shattered.

Camus was born in Modovi, French Algeria in 1913 and emerged as a novelist in the 1940s, particularly after the release of *The Stranger* in 1942. He won the Nobel Prize for Literature in 1957 at the age of 44.[12] Beyond his novels, however, and what especially concerns this enquiry, he was a prominent journalist and political activist. In 1939, he gained renown for his reportage revealing the French colonial administration's treatment of the Kabyle population in his native Algeria. The series, titled *Misère de la Kabylie* (Misery of Kabylia), appeared as a sequence of articles in the socialist newspaper *Alger républicain* from June 5 to 15, 1939. He further cemented his political reputation when he served as *rédacteur en chef* of the underground

9. James McDougall, *A History of Algeria*, 125; John P. Entelis, Algeria: The Revolution Institutionalized (Boulder, CO: Westview Press, 1986), 32; Michael Brett, "Legislating for Inequality in Algeria: The Senatus-Consulte of 14 July 1865," 459.

10. James McDougall, *A History of Algeria*, 183-84.

11. Ibid., 184.

12. Albert Camus, *Resistance, Rebellion, and Death: Essays* (Vintage, 2012), "Introduction," Kobo eReader.

newspaper Combat from Fall 1943 to 1947, during the Nazi occupation of France.[13] *Combat* was the mouthpiece of the United Resistance Movements (including *Combat*, *Libération*, and *Franc-Tireur*), had a print run of nearly 250,000, and all involved with its publication risked their lives by speaking out against the Vichy Regime and German occupiers.[14] His celebrity status was thus enlarged after the liberation of Paris in August, 1944, and he would at times use his outsized voice or at others his silence to criticize the colonial policy of the French and advocate for equal rights and political representation across the French Empire (later the French Union). Controversially, however, Camus maintained that French colonies should be integrated or federated, not granted independence. He died in a car accident in 1960. Therefore, tragically, his reaction to Algerian independence will never be known. Nonetheless, by analyzing his views during the years of the Algerian War from 1954 to 1958 based on a selection of twenty-three essays collected in Resistance, Rebellion, and Death and more comprehensive materials in the Algerian Chronicles, I can crystallize the core arguments driving the Algerian conflict and introduce the problem of violence.[15]

As Camus makes clear in his "Appeal for a Civilian Truce," and in many other instances, he categorically opposed violence in all forms, whether it be the violence of the French colonialist or bombs placed by an FLN *fida'iyya* (urban bomber). For this reason, and others, Camus refused either to support Algerian independence or French colonial rule outright. As Tommaso Visone notes, '"recognizing the "*longue erreur*" of French rule that had led the Arabs towards terrorism," Camus perceived the latter as '"a "*sanglante*" mistake,"' while '"the subsequent French repression was "*aveugle et imbécile*," inspired by totalitarian principles and destined to radicalize the conflict even further."'[16] Thus, while Camus opposed Algerian independence, and therefore could be said to support colonial interests in practical terms, he remained consistent in his stance on violence. He refused to condone the "reprisals against civilian populations and the use of torture…in which we [the French] are all involved" while maintaining "no cause justifies the death of the innocent."[17]

Aside from his condemnation of violence in any form, there are other dimensions to Camus's argument: one which is shockingly prescient and one which is personal. As a *pied noir*, Camus had family still living in Algeria and was appalled by the idea of a nationalist expulsion of French settlers, numbering nearly one million, to create an "Algerian" state. Such an expulsion was a key part of the FLN's platform. For this reason, he questioned the role and responsibility of the intellectual, asserting "when the fate of men and women of one's own blood is bound, directly or indirectly, to the articles one writes in the comfort of the study, one has a right to hesitate."[18] This statement stands in deliberate contrast to ideas expressed by those who supported Algerian Independence, such as Frantz Fanon, as well as Jean-Paul Sartre in his preface to Fanon's work *Wretched of the Earth*. These philosophers, in contrast to Camus, maintained that action holds a higher value in ending colonial oppression than the vacillating contemplation of intellectuals. While Camus claims "the intellectual has the role of distinguishing…the respective limits of force and justice…to clarify definitions in order to disintoxicate minds and to calm fanaticisms, even when

13. Tommaso Visone, "Neither Dominant nor Dominated: The Decolonial Federalism of Albert Camus," *History of European Ideas* 49, no. 8 (October 2023), 1360.

14. Peter Lowe, "Resistance and Rebuilding: The Wartime Writings of George Orwell and Albert Camus," *English Studies* 90, no. 3 (June 2009), 310.

15. Originally published in 1958 under the title *Actuelles III: Chronique algériennes*, the text was part of a series of Camus's collected journalistic work. Selected essays were published first in English as *Resistance, Rebellion, and Death* translated by Justin O'Brien, but a more complete version and better translation by Arthur Goldhammer was released in 2014.

16. Visone, "Neither Dominant nor Dominated," 1363.

17. Camus, "Preface to the Algerian Reports," in *Resistance, Rebellion, Death*, and "Appeal for a Civilian Truce."

18. Camus, "Preface to the Algerian Reports."

it is against the current tendency," Fanon might counter that the role of the intellectual is to think themselves to death and never to act.[19] Camus perceived himself as a neutral, cool-headed force for good while the Algerians and French alike were consumed by unconsidered passions. Fanon, on the other hand, observes that an intellectual, once exposed to the suffering of a colonized people, will realize "precious time has been wasted in useless commentaries of the colonial regime…the changeover will not be a reform, nor a bettering of things."[20] The intellectual cannot fix a colonial regime by reform, as Camus imagines. Oppression must be dismantled by revolutionary, not political, action.

This divergence in revolutionary theory between Camus and Fanon finds itself based first and foremost in a deeply personal element of Camus's life. Camus, as can be noted in his literature, found himself in a unique position as a French Algerian. Neither considered fully Algerian by the natives nor fully French by those in the metropole, the *pied noir* was, from the outset, alienated. Nonetheless, Camus maintained a stance against Algerian independence. This opposition set him apart from both Algerians and the radical French left, while criticizing colonialism othered him from mainstream French positions, at least as expressed in foreign policy. David Carroll, quoting French-Tunisian writer Albert Memmi, describes this dilemma as the "colonialist who refuses," one who """is considered a traitor by other colonizers and yet who "places conditions" for his cooperation with the colonized in their struggle for justice. This is what leads to his "political ineffectiveness" and solitude: "Everything confirms his solitude, bewilderment and ineffectiveness. He will slowly realize that the only thing for him to do is to remain silent."'[21] Camus established for himself a neutral third position concerning the Algerian situation which, supported by an idealistic and unlikely, yet not invalid, vision, was endorsed by few and doomed to be lost in the chaos of more absolute positions. Camus, particularly from 1956 to 1958 and after, would leverage this alienation of the moderate voice by exercising his own silence. The first silence can be accounted for by the failure of his attempt to call for a "civilian truce" after bringing prominent Algerian leaders together.[22] The second silent period followed critical disinterest to the release of his collected writings on Algeria in 1958 until his death in 1960.[23] The silence of an influential voice like Camus's, far from ineffective, made a substantial statement, even if the writer's vision for Aleria never manifested.

Fundamentally, the French Algerian author could never move past the basic personal bias that his connection to the land and his family left him with. In a famous quote, Camus remarked, "People are now planting bombs in the tramways of Algiers. My mother might be on one of those tramways. If that is justice, then I prefer my mother."[24] Frequently polemicized as some variation of "Between justice and my mother, I choose my mother," this quote cuts to the tragic impossibility of Camus's position as a *pied noir* and the internal conflict of conscience he suffered. He frequently returns to the argument that many *pied noirs* were poor and born in Algeria, unwilling or unable to move elsewhere. This argument, however, fails to appraise the basic injustices of the colonial situation and the gulf separating the colonizer from the colonized. In an ideal world, freedom of movement would be a realizable good, yet the colonial situation was far from ideal. Further, by the end of the colonial era and particularly after Sétif in 1945, the point of reconciliation had been passed. Camus made repeated calls for such reconciliation and dialogue, including when he predicted he "shall be told…it is too late," yet he was never willing to adapt his own dialogue and

19. Ibid., 18.

20. Fanon, *Wretched of the Earth*, 126.

21. David Carroll, "Camus's Algeria: Birthrights, Colonial Injustice, and the Fiction of a French-Algerian People," MLN 112, no. 4 (September 1997), 520.

22. Horne, *A Savage War of Peace*, 124-126.

23. Alice Kaplan, "Introduction," in *Algerian Chronicles*, by Albert Camus, trans. Arthur Goldhammer (Cambridge, MA: Harvard University Press, 2013), 4-5.

24. Camus, Algerian Chronicles, 216.

make concession to Algerian independence.[25] He nonetheless remained consistent in the noble hope "that in the end words will prove stronger than bullets."[26] To understand exactly how Camus's approach toward Algeria was mistaken despite his moral consistency, one must first be familiar with the alternatives he proposed.

In the first place, Camus made cogent and important criticisms of French colonialism. For example, his work exposing famine, poverty, and the injustices of political disenfranchisement in the Kabylia region directly placed blame on French imperialism before discussions of the "Algerian situation" had entered the mainstream. For writing *Misère de la Kabylie*, Camus was blacklisted by the French authorities and *de facto* exiled from Algeria, while the controversy contributed to the shuttering of the *Alger républicain*.[27] Camus's main critiques concerned the massive poverty and overpopulation of the region, the injustice of political disenfranchisement under the *communes* mixtes system, low wages, criminally stupid distribution of funds and food, and the lack of accessible public education. These critiques may seem obvious now, but it was controversial and considered "unpatriotic" in 1939, liable to provoke French vitriol. Camus's series of articles are full of moving prose, statistics, and his own political suggestions for reform, but, in his words, "I despair of ever being able to convey them all."[28] It suffices to say that Camus truly sought to do what he thought was right. He opposed colonialism. He considered *Misère de la Kabylie* and the personal consequences of its publication to be statements of his anticolonial sympathies, yet he could not conceive of it in its full terms. Too often, he vacillated and consoled himself that French authorities could merely do better. Nor could he conceive France without Algeria. While it would be convenient for critics to believe Camus was firmly a colonialist, as many in Algeria who boycott his work postulate, it is simply not true. Whatever injustice the author passively condoned, he always believed, "the misery across the way placed the beauty of the world under a kind of ban."[29]

Regarding the Algerian War itself, in his "Preface to the Algerian Reports" he noted, Torture has perhaps saved some, at the expense of honor, by uncovering thirty bombs, but at the same time it aroused fifty new terrorists who, operating…in another place, will cause the death of even more innocent people," concluding "such fine deeds inevitably lead to the demoralization of France and the loss of Algeria."[30] This second element, the prescient side of Camus's argument, ironically serves as a counterpoint to his own conclusions. The intensity of French repression is ultimately what started and lost the conflict for the colonial authorities. The violent response to protests in Sétif and Guelma on 8 May 1945, after which around 20,000 Arabs were killed in reprisals was, "counterproductive, as it turned out, as this incident became a symbol of French colonial repression and a rallying point for the insurrection."[31] The protests included many returning Algerian war veterans who were angered by a return to inequality despite war service, as in many decolonial instances. Further, although around 103 European settlers were murdered, some in brutal fashion, the protests were largely nonviolent and the French response was hugely

25. Albert Camus, "Letter to an Algerian Militant," in *Resistance, Rebellion, and Death*, (Kobo e-reader); see also Ibid., "Preface to Algerian Reports," "Appeal for a Civilian Truce," and "Algeria 1958," where the idea of reconciliation is repeated.

26. Albert Camus, "Toward Dialogue," *Neither Victims nor Executioners* (November 30, 1946), in *Camus at Combat: Writing* 1944-1947, trans. Arthur Goldhammer (Princeton, NJ: Princeton University Press, 2007), 276.

27. Kaplan, "Introduction," in *Algerian Chronicles*, 15.

28. Albert Camus, *Algerian Chronicles*, 46.

29. Ibid., 46.

30. Camus, "Preface to the Algerian Reports."

31. Visone, "Neither Dominant nor Dominated," 1361, and Russell Grigg, "The Trial of Albert Camus," *Sophia* 50, no. 4 (December 2011), 596.

disproportionate.[32] Even though he would never see the end himself, Camus understood that the loss of credibility France suffered, both at home and on the international stage, could ultimately lead to the end of the conflict. Camus appreciated the material and social conditions of repression that breed acts of terrorism and that acts of violence are only likely to exacerbate.

Nonetheless, Camus remained firm in his refusal to support Algerian independence from the French state. He proposed two core alternatives, changing from one to the other during distinct periods in his life. Visone identifies how Camus initially argued for a "democratic reformist" or assimilationist approach but, after 1945, shifted to a federal approach to address the growing problem of nationalism and support his idea of a "Mediterranean" culture. Essentially, the first system involved granting Arab and Berber citizens equal rights and integrating them into the French system. While nominally an improvement on the colonial system, the overarching sentiment, as reflected in his literary work from this period, was that citizenship would be first and foremost *French* citizenship. Equal rights did not require integration on terms that preserved culture but required that Algerians be turned "into French citizens without challenging the structure of the Empire."[33]

Camus's experience in WWII, however, made him aware of the dangers of nationalism and inspired an approach based in federalism, as well as a "Mediterranean internationalism." The federal approach emphasized a system of semi-autonomous provinces with local governments representative of natives and settlers that would ultimately be subservient to the French national government. Carroll argues that Camus conceived this idea of transcendent culture as early as 1937 when, at a speech in Algiers, he praised North Africa as "one of the only lands in which Orient and Occident cohabit what is most essential in Mediterranean genius springs perhaps from this meeting."[34] Thus, in the idealized version of Algeria that Camus would frequently return to in his writings and speeches, one could imagine a world in which neither colonial injustice nor the French language predominated but, in which, because of shared values and history, cultures could meet and, from this meeting, thrive. This idea was the core of Camus's federal system, yet the author was wrong to imagine over a hundred years of injustice could be forgotten in a decade or the bonds of nationalism overcome so easily. While dreams of internationalism would improve the world, the scars of colonialism and war are anathema to fraternity. The question therefore rises, why would Algerians accept a system where their interests were federated and subject to a foreign power when they could have complete autonomy? Algerians sought an independent government untethered from a country that, in all the time since 1830, had never provided a reason it should be trusted.[35]

While liberal Frenchmen such as Camus may have had good intentions in advocating colonial reform, their solutions were ultimately too moderate and too late to rectify the past. After the 1946 Constitution maintained the inferiority of '*outremer*' French citizens, the 1947 statute established the double electoral college, and a 1948 vote killed aspirations to an Algerian assembly, trust in political solutions crumbled.[36] To apprehend why Camus nonetheless persisted in a reformist approach, his literature, thought-provokingly criticized by Edward Said in *Culture*

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32. John Lejeune, "Revolutionary Terror and Nation-Building: Frantz Fanon and the Algerian Revolution," *Journal for the Study of Radicalism* 13, no. 2 (January 1, 2019), 12.

33. Visone, "Neither Dominant nor Dominated," 1360.

34. Albert Camus, "*La culture indigene, la nouvelle culture méditerranéenne*," in *Essais*, 1324-2, quoted in Carroll, "Camus's Algeria: Birthrights, Colonial Injustice, and the Fiction of a French-Algerian People," 522.

35. Visone, "Neither Dominant nor Dominated," 1366. Note: The proposed system would have entailed, "a regional Algerian assembly [that] expressed the specific character of Algeria while a federal senate, where Algeria is represented, is able to hold legislative power for all that which (military and foreign affairs, for example) concerns the federation in its entirety [translation my own]." Albert Camus, *Actuelles III. Chroniques Algériennes*, 393.

36. Ibid., 1362.

and Imperialism, merits mention. Camus's most prominent 1942 novel, *L'étranger* (The Stranger) recounts the story of Meursault, a dispassionate Frenchmen living in Algiers, French Algeria. Narratively, the story begins with the death of Meursault's mother and is divided into two distinct parts: at the end of the first, he kills an unnamed Arab, throughout the second he is put on trial and ultimately executed. The structure and events may seem meaningless, yet careful analysis yields layers of complexity.

While the universal existentialist dimensions of the novel are usually acknowledged, including by Said, the colonial dimensions remain disputed. For example, one of the most damning elements of Camus's novel in the eyes of its ideological critics is that the Arab killed by Meursault, and in fact all Arabs and characters aside from those who are distinctly French, are notable for their "blankness and absence of background," meriting only the French proper noun for "Arab."[37] It is these nameless characters who play an essential role in the story (after all, "the" Arab is who Meursault kills), yet who, despite outnumbering French settlers nearly 9:1 in French Algeria, remain strangely absent from the story in substantial ways. The same is true of Camus's version of Oran in *La peste* where "in the novel only 'the local color of the facades of their houses remains.' The Arab population is thus evoked…only as an exotic background…with both its existence and disappearance irrelevant."[38] Similarly, in *L'étranger*, the Arabs are largely absent, present only as silent, ominous sentinels and ultimately killed by a casual and inhumane burst of violence. Meursault unloads several rounds into an Arab, feels no remorse, and yet, even at trial, the crime itself is mentioned less than Meursault's unnatural reaction to his mother's death.

Can these trends in Camus's writing be explained, as Said argues and Grigg summarizes, because "Camus' consciousness is that of Western dominance, and his conscience is its symptom," or is there an alternate reason for these omissions?[39] Is Camus, who so abhorred violence in any form in his political writings, subconsciously endorsing its colonial variety in the savage killing of the Arab? And is Camus's Oran an imagined colony cleansed of the non-French or an allegory for WWII, the Algerian context superfluous? The most extreme conclusions seem unlikely. One of the goals of imperialism in its basic form is to remold the colonized territory in the colonizer's image until the natives, rather than the settlers, become the outsiders, ostracized by law and an imbalance of power. Grigg argues that by becoming a stranger himself, Meursault actually becomes like an Arab. Under normal circumstances, it might seem that a French colonist would be favored by the justice system over an Arab and that consequences would be minor for such a murder in the colonial system. This is not the case in *The Stranger*. Meursault is tried and executed, yet "It is as if he would have a better chance of getting off the charge of killing another man than of failing to show appropriate grief at his mother's funeral."[40] Meursault is indifferent to the death of his mother, as well as to his crime. He is an atheist and fails to uphold the supposed values of a Frenchman. To become a French citizen, it was almost always necessary for an Algerian to be a Christian. Based on these facts, and the fact that most of Meursault's fellow inmates are Arabs, Grigg argues that to become a stranger is essentially to become Arab.

This rationalization, while with merits, stretches to produce an argument that Camus did not fully intend to make. To start, it is impossible to completely explain away the absence of characterization and identity received by Arabs in Camus's works. Even in Camus's wider works, there are no especially developed Arab characters. Examples include the voiceless, but at least acknowledged, Said in the short story *Les muets* ("The Mutes") and the side characters in the posthumously published novel *Le premier homme* (The First Man). Alice Kaplan observes that a 1938 article "Men Stricken from the Rolls of Humanity" is the only time in Camus's

37. Grigg, "The Trial of Albert Camus," 595.

38. Carroll, "Camus's Algeria: Birthrights, Colonial Injustice, and the Fiction of a French-Algerian People," 524.

39. Grigg, "The Trial of Albert Camus," 595.

40. Grigg, "The Trial of Albert Camus," 601.

work he demonstrates he hears or understands Arabic.[41] His imagined version of Algeria always predominates with Frenchman, and Said's critiques are correct in the sense, even if subconsciously, that Camus favors a distinctly French citizenship and society in his Algeria.

Stripped of its native characteristics, one wonders why Camus even chose Algeria over any other nondescript setting. There are plenty of examples of the unjust legal system in colonial Algeria, so there hardly seems a need to invoke the theme in such an indirect way, much less considering Meursault is a character with legitimate moral flaws. It would be more accurate to argue that The Stranger is an argument against the senseless violence and indifference Camus experienced in his time. The reader is meant to reject Meursault's inexplicable outburst of violence, hence his execution. Meursault rejects any value system. He "opens himself to the gentle indifference of the world," and wishes that spectators at his execution greet him with "cries of hate."[42] Meursault neither values his own life nor those of others. Consistent with Camus's frequent and unequivocal condemnations of all violence, then, one must assume the reader is meant to feel a natural revulsion to Meursault's indifference. For Camus, this apathy represents the excesses of existential freedom. Thus, while The Stranger could indirectly serve as a colonial critique, in that it is a critique of violence and colonialism is always violent, it hardly serves as a blanket condemnation of all manifestations of imperialism.

It would also be accurate to argue that Grigg glosses over some of the key arguments put forward by Said. In *Culture and Imperialism*, Said sets forth several goals: to show that there always existed some form of resistance to Western imperialism (an assumption carried over from his work, *Orientalism*), to refute the notion that the source of the world's significant thought and action lies only with the West, and to elucidate how culture, particularly literature, has been inextricably intertwined with a colonial tradition, narrative, and justification. He also has a secondary focus to connect imperial legacies with modern problems of isolation, separation, mass displacement, and nationalism. He observes that national tendencies to reject global society and elevate their culture as the best, refusing to integrate or be in dialogue with immigrant populations, are a flaw of political conscience in both postcolonial and Western states. Thus, for Said, aside from slavery, land expropriation, and mass violence, one of the great injustices of imperialism is to impose one culture over another. This suppression of culture and reimaging of identity, necessary to an imperializing mission, is carried out largely through artistic mediums and, for the French and British, primarily the novel.[43] It would be fair to say also that Said chose widely beloved authors, such as Jane Austen and Camus, to make his point more uncomfortable and impactful without denying the creative genius of the works themselves. These works, he clarifies, are made more, not less, interesting by the complex motivations or subconscious biases of their authors.[44]

Said's goal is to focus on novels read "first…as great products of the creative or interpretive imagination," but to situate these novels in their historical context and experience. Camus, who is an example of "passive collaboration…on the part of intellectuals, artists, journalists, whose positions at home are progressive and full of admirable sentiments, but the opposite when it comes to what is done abroad in their name," should be read, Said asserts, as part of a tradition of literature and empire stretching back to 1830.[45] Camus's colonial impulse is characterized as "extraordinarily belated", in that postcolonial revolutions were happening around the world. History would prove also that French implantation in Algeria could not be extended

41. Kaplan, "Introduction," in *Algerian Chronicles*, by Albert Camus, trans. Arthur Goldhammer, 16.

42. Albert Camus, *The Stranger*, trans. Matthew Ward (New York: Vintage International, 1988) 69-71, 123.

43. Edward Said, *Culture and Imperialism* (New York: Alfred A. Knopf, 1993), xii-xxii, 173.

44. Edward Said, *Culture and Imperialism*, xiv.

45. Ibid., xxiii, 176, 184.

indefinitely. Nonetheless, Said makes convincing arguments connecting Janine from "*La femme adultère*" ("The Adulterous Woman"), *Meursault from l'Étranger*, and even the cast of *La peste* (The Plague), to this colonial tradition. Algeria is construed as a blank, rugged landscape—presumably wiped clean by French imperialism—where exiles and adventurers may go to find themselves, enrich themselves, or start anew. Janine escapes her husband to engage in a sensual ritual of communion with the land. Rieux works to save a city from plague, tallying casualties, who must undoubtedly include Arabs, yet none but the French are ever mentioned. Camus's works, even if subconsciously, undeniably reconstitute Algeria as French, connect French narratives as inseparable from the land, and as Camus would explicitly do in his political writings, deny any possibility of Algerian independence.[46] Considering the unavoidable presence of French power and oppression in Algeria, which no Algerian writer would exclude, a lack of this domination in Camus's work can only be construed either as denial or as a deliberate "last great clarification" of the imperial mission before "ruin overtakes it."[47]

Taken altogether, Camus's discourse on the Algerian Revolution amounts to a complex, yet ultimately flawed, attempt to combine humanistic and nonviolent values, colonial justification, and a distinct Eurocentrism. Camus makes many important and valuable contributions to understanding the root causes of violent revolution; however, his humanism falls short when, through advocating inaction, it passively condones the status quo of a colonial system. Furthermore, Camus's entanglement with the *pied noir* population, itself a more powerful political bloc than the entirety of the much larger (although mostly disenfranchised) native population, inflected his rhetoric with a deeper familial bias—one he even acknowledged.48 Any attempt to separate Camus from colonial influences deprives the work of crucial context. Therefore, while it is essential to analyze the perspective of such an influential, complex, and enduringly brilliant writer as Camus, it is also necessary to acknowledge his shortcomings and connections to a colonial legacy situated amidst the complex collision of the Algerian Revolution and the philosophical currents of the modern age.

46. Ibid., 176, 182, 184-185.

47. Ibid., 185.

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Adverse Maternal Health Outcomes in Tennessee and Expanded Access to Doula Care

Casey Pestona

ABSTRACT

Tennessee experiences the highest maternal mortality rate in the United States. Yet most adverse maternal health outcomes are preventable, highlighting gaps in support and healthcare access. Expanding access to doula care provides an evidence-informed strategy to address this issue, as research links doula support with lower rates of medical interventions, reduced preterm births, improved maternal health, and cost savings. This paper uses ecological systems theory and a reproductive justice framework to examine how doula care can mitigate systemic failures, enhance agency for birthing individuals, and address racial and social disparities in Tennessee. Based on these findings, the paper recommends implementing TennCare coverage for doula services, investing in workforce development, and establishing community-based programs to promote equitable and culturally responsive maternal healthcare.

The World Health Organization (WHO) defines the maternal mortality rate (MMR) as the annual number of lives lost to pregnancy or pregnancy-related complications (World Health Organization, n.d.). The MMR includes deaths that occur during pregnancy or up to 42-days postpartum and may relate to obstetric or non-obstetric causes. It is important to recognize that the MMR excludes pregnancy-related deaths that occur between 43 days and a year postpartum, which may result in an underestimation of overall maternal mortality. Most high-income nations have observed a decline in maternal mortality in recent decades, yet the United States has seen an increase in maternal deaths (Huang et al., 2024). The MMR increased by 78% in the United States from 2000 to 2020 and is considerably higher than the MMR in similarly developed nations.

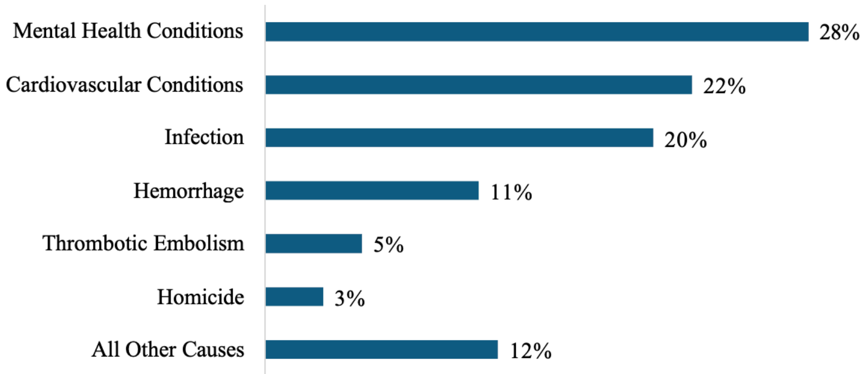
A key critical measure of maternal health related to the MMR is maternal morbidity, or nonfatal health complications that can occur during pregnancy or in the postpartum period (Declercq and Zephyrin, 2021). Morbidity-related outcomes are classified into three categories: maternal morbidity, severe maternal morbidity (SMM), and near-miss maternal morbidity. Maternal morbidity includes any unexpected complications that arise during or after pregnancy, while SMM involves health conditions that lead to life-threatening complications and potentially long-term consequences. Near-miss maternal morbidity includes instances of SMM in which death is narrowly averted.

The United States reported an MMR of 22.3 deaths per 100,000 live births in 2022 (Hoyert, 2024). However, mortality represents only the worst outcomes. Evidence suggests that for every maternal death, about 70 individuals experience severe complications (George et al., 2023). Applying this ratio to data from 2022 on maternal mortality reveals that approximately 57,190 individuals suffered from SMM that year alone (George et al., 2023; Hoyert, 2024), demonstrating clear systemic failures in American maternal healthcare. These outcomes are not distributed uniformly, as serious disparities persist related to geography and race. Tennessee, in particular, reports some of the most unfavorable maternal health outcomes in the nation. In 2022, Tennessee's MMR was 55 deaths per 100,000 live births—more than double the national average of 22.3 deaths per 100,000 live births (Hoyert, 2024; Tennessee Department of Health, 2024). Risks are disproportionately higher among Black and Native American women, groups more than twice as likely to die from pregnancy-related complications than white women in the United States (Wang et al., 2023).

Adverse maternal health outcomes indicate a critical public health crisis, and suggest broader repercussions related to family structure and societal wellbeing. Although mortality drivers vary by state and population, closer examination of available data can help identify the most appropriate interventions. The Tennessee Department of Health (2024) reported that the leading causes of maternal death were mental health conditions including accidental overdoses, cardiovascular conditions, infection, hemorrhage, thrombotic embolism, and homicide (refer to Figure 1). In Tennessee, 89% of maternal deaths occurring from 2017 to 2020 were deemed preventable (In Our Own Voice: National Black Women's Reproductive Justice Agenda, 2024). The staggering rate of preventability in Tennessee reveals a need for greater healthcare accessibility as well as support for pregnant individuals. This study analyzes adverse maternal health outcomes in Tennessee from a social work perspective and argues that expanding access to doula care stands as a feasible intervention to support birthing individuals and mitigate maternal mortality and morbidity.

Figure 1

Leading Causes of Maternal Death in Tennessee



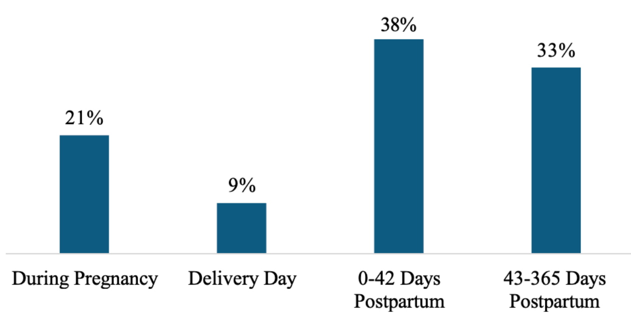
Note. This table depicts the leading causes of maternal death in Tennessee from 2020 to 2022 (Tennessee Department of Health, 2024, p.10).

Tennessee's Maternal Health Crisis

Tennessee has among the worst maternal health outcomes nationally (Joyce et al., 2025). According to the March of Dimes Report Card of 2025, Tennessee has the highest rate of maternal mortality in the nation (42.1 per 100,000 live births). Although the current MMR has declined from the 55 deaths per 100,000 live births observed during the COVID-19 pandemic (Hoyert, 2024), the persistently high rate underscores the need for urgent, evidence-informed interventions. The report also documents high rates of SMM. Maternal mortality and morbidity are marked by pronounced disparities across race, geography, and socioeconomic status (Tennessee Department of Health, 2024). From 2020 to 2022, the majority of pregnancy-related deaths occurred after pregnancy, with only 20% of deaths occurring during pregnancy. Additionally, the Tennessee Maternal Mortality Review Committee (MMRC) found that in 2022, 76% of deaths that occurred during pregnancy or up to a year postpartum were preventable. Together, these findings highlight a substantial gap in maternal health services and demonstrate the need to expand access to high-quality, timely care, especially in the postpartum period.

Figure 2

Timing of Pregnancy-Related Deaths



Note. This table depicts the timing of pregnancy-related deaths in Tennessee from 2020 to 2022 (Tennessee Department of Health, 2024).

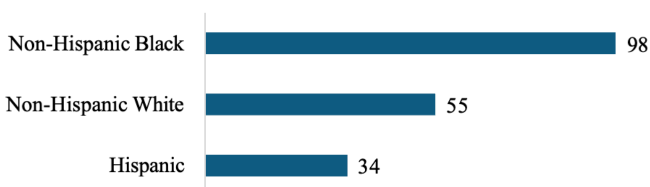
The Tennessee Department of Health (2024) found that mental health conditions represent the leading cause of maternal mortality in Tennessee. From 2020 to 2022, overdoses accounted for 34% of all pregnancy-associated deaths. The Eastern Grand Division of Tennessee experienced the greatest increase in maternal mortality in which substance use disorder (SUD) was a contributing factor; between 2017 and 2022, fatal overdoses among pregnant or postpartum individuals increased by 300%. Among maternal deaths associated with mental health conditions, 70% of deaths were attributable to SUD, while 18% were attributable to major depressive disorder.

The second leading cause of maternal death in Tennessee is cardiovascular conditions (Tennessee Department of Health, 2024). Cardiovascular conditions represented 22% of maternal deaths from 2020 to 2022. About one-third of these deaths were caused by cardiomyopathy; 29% involved preeclampsia and eclampsia. Non-Hispanic Black women were the most vulnerable group to maternal deaths caused by cardiovascular conditions. Notably, about 70% of cardiovascular related maternal deaths could have been prevented (Luther et al., 2021). Preventability is influenced by a range of factors, including preexisting chronic conditions, insufficient knowledge about symptoms, and health system shortcomings, including ineffective provision of treatment and financial barriers to care.

The Tennessee MMRC concluded that more than one-third of pregnancy related deaths from 2020 to 2022 were attributable to inequitable care from service providers (Tennessee Department of Health, 2024). Implicit bias among healthcare workers related to race, ethnicity, SUD, obesity, and other mental health conditions has been associated with reduced quality of care for pregnant individuals as well as adverse outcomes, including death. Among these forms of biases, racial discrimination represents a significantly consequential driver of maternal health inequities. Wang et al. (2023) explains that race and ethnicity are the most significant determinants of maternal health. This is reflected by the evidence that Non-Hispanic Black women are nearly twice as likely to die during pregnancy or in the postpartum period in Tennessee (Tennessee Department of Health, 2024).

Figure 3

Pregnancy-Related Deaths per 100,000 Live Births in Tennessee by Race/Ethnicity



Note. This table depicts pregnancy-associated deaths per 100,000 live births by race and ethnicity in Tennessee occurring during pregnancy and up to a year postpartum from 2020 to 2022 (Tennessee Department of Health, 2024, p. 12).

In addition to provider bias, maternal health outcomes are shaped by intersecting social and structural factors including socioeconomic status, education, poverty, maternal age, family support and structure, housing, access to transportation, and healthcare infrastructure (Wang et al., 2023). In Tennessee, those who have received less education, are unmarried, and insured through Tennessee's Medicaid program, TennCare, experience the highest rates of mortality during pregnancy and the postpartum period (Tennessee Department of Health, 2024). Pregnancy-related deaths are three times higher among those enrolled in TennCare than individuals insured through private insurance. Although TennCare serves individuals who face disproportionate health challenges, persistent concerns exist regarding the quality of healthcare enrollees receive (Wadhwani, 2025). Barriers to provider choice and medication access remain evident, and TennCare's managed care organizations fall within the bottom quartile of national Medicaid managed care plans for prenatal and postpartum care. Additionally, the state's decision to not expand Medicaid leaves many low-income Tennesseans uninsured, exacerbating disparities in access to healthcare (Cervantes et al., 2025). Collectively, these findings indicate critical gaps in maternal healthcare, particularly among socioeconomically marginalized populations, that contribute to maternal deaths.

Without targeted intervention, gaps in maternal healthcare are likely to widen. In 2022, it was reported that 44% of Tennessee's rural hospitals are at risk of closure due to lack of funding (Tennessee Rural Health Care Task Force, 2023). Since this report, at least two maternity units have either closed or suspended services in Henry County and Giles County (Jayanth & Maynard, 2025; Kraus, 2023). Further closures may occur following the 2025 passage of the One Big Beautiful Bill Act (OBBBA), which substantially reduced funding for Medicaid (Levinson & Neuman, 2025). These funding cuts will not only impact accessibility of insurance nationally but will also take away critical funding from rural health systems that are heavily reliant on Medicaid support—particularly concerning when considering that nearly every county (97%) in Tennessee faces provider shortages (Tennessee Rural Health Care Task Force, 2023), compromising the availability of healthcare services before, during, and after pregnancy.

The March of Dimes Report Card (2025) outlines several actionable steps that the state of Tennessee can take to improve maternal health outcomes: expanding Medicaid eligibility; mandating paid family leave; increasing mental health screenings for postpartum depression; and expanding access to doula care. Expanding access to doula care has proven to be an increasingly popular strategy; as of 2024, 18 states and Washington D.C. adopted Medicaid coverage for doula care, and numerous others are in the process of enacting similar policies (Chen, 2024). In Tennessee, legislation to include doula services under TennCare (House Bill 0295/Senate Bill 044) was introduced in 2025 by State Representative Harold Love and State Senator London Lamar, but it did not pass the legislative session (Tennessee General Assembly, 2025).

Evidence shows that doula care correlates with improved infant and maternal health outcomes (Sobczak et al., 2025), highlighting the potential for such services to mitigate disparities in healthcare. The following section will explore how maternal mortality and morbidity impact individual, familial, and community outcomes.

Micro-Level Analysis

Adverse outcomes during pregnancy and in the postpartum period can have a profound impact on birthing individuals. Ayers et al. (2024) explain that one in three births are characterized as traumatic for the individual giving birth. These experiences are not evenly distributed; traumatic pregnancies and deliveries disproportionately affect racially marginalized individuals, transgender individuals, and those with disabilities. Additionally, prior miscarriages and previous adverse maternal experiences may further compound stress during subsequent pregnancies. Within medical settings, birthing individuals may experience a lack of agency and insufficient communication regarding warning signs of serious complications. They may also face challenges in advocating for themselves, which can lead to serious physical and emotional consequences.

Physical and Functional Impact

For individuals with preexisting health issues, such as cardiovascular conditions, pregnancy can exacerbate symptoms (Wang et al., 2023). This may impact a pregnant individual's ability to be self-reliant and place them in vulnerable positions, as well as increase their chances of disability and chronic pain. Pregnancy may also lead to unexpected medical interventions that can be traumatizing, such as emergency caesarean-sections (ECS) (Horsch et al., 2017). In extreme cases, physical complications experienced during and after pregnancy may lead to the death of the birthing individual.

Psychological and Emotional Impact

Pregnancy and childbirth may also lead to negative psychological and emotional outcomes. Ayers et al. (2025) note that one in five women experience anxiety disorders during pregnancy and postpartum, and most cases go untreated. Stress and anxiety can be substantially worse for individuals who experience inequitable perinatal care. This is particularly evident among Black women who are vulnerable to racial discrimination (Sonderlund et al., 2021). There are also concerns regarding the emotional impact of unintended medical interventions; ECS may increase the pregnant individual's likelihood of developing posttraumatic stress disorder (PTSD) (Horsch et al., 2017). The postpartum period presents additional challenges. Amer et al. (2024) report that while approximately one in seven women are formally diagnosed with postpartum depression (PPD), 50% of new mothers who display symptoms remain undiagnosed. Untreated PPD can substantially impair functioning, disrupt early parent—child attachment, lead to sleep disorders, and exacerbate feelings of guilt and self-blame among new parents. There are also concerns regarding social isolation and feelings of loneliness that often demonstrably follow childbirth (Nowland et al., 2024). This is especially relevant in Tennessee, where mental health conditions contribute to 28% of pregnancy-related deaths (Tennessee Department of Health, 2024).

Mezzo-Level Analysis

At the mezzo-level, adverse maternal health outcomes disrupt family systems by altering caregiving roles, economic stability, and relational functioning within households. Families are likely to experience financial strain and increased caregiving burdens even during uncomplicated pregnancies and deliveries, and this can worsen when the pregnant individual faces health complications. Family members may navigate new roles to manage household responsibilities or provide care for children, often with limited support. Families may also face emotional difficulties witnessing loved ones suffer. These disruptions are most severe in cases of maternal death. In Tennessee, where 44% of families are asset-limited (United Ways of Tennessee, 2025), and access to healthcare remains constrained (Tennessee Rural Health Care Task Force, 2023), the impacts of adverse maternal health outcomes are particularly pronounced.

Impacts on Children

Challenges during pregnancy can have consequential effects on offspring. Physiological stress responses during pregnancy, including elevated cortisol, can contribute to premature birth and low infant birth weight, which can have negative long-term consequences for offspring (Sonderlund et al., 2021). Adverse maternal psychological experiences, such as depression, stress, and anxiety, may also impact attachment bonds with children (O'Dea et al., 2023). Infants who do not form healthy bonds with caregivers are likely to experience insecure attachment styles and have higher rates of colic. These impacts can span through adolescence and lead to cognitive and behavioral issues. For infants who lose their mothers, the effects can be even more severe; maternal mortality is associated with infant mortality and poorer health outcomes for surviving children (Declercq et al., 2025).

Macro-Level Analysis

In addition to individual and family level consequences, adverse maternal health outcomes carry serious societal implications. Maternal mortality and morbidity constitute critical public health concerns and place strains on healthcare systems. The strain is particularly evident in states like Tennessee, where shortages of healthcare providers already limit access to care for the general population (Tennessee Rural Health Care Task Force, 2023). Experiences of pregnancy-related complications, whether by direct experience or by witnessing the suffering of a loved one, can often contribute towards mistrust of healthcare providers, resulting in subsequent avoidance of care. Collectively, these dynamics contribute to broader social and economic consequences that can further exacerbate existing public health challenges.

Social Impacts

Rates of maternal mortality and morbidity can serve as indicators of overall societal wellbeing. Poor maternal health outcomes often reflect underlying social inequities while reinforcing existing disparities. Chronic illness and pregnancy-related disability can undermine economic stability, autonomy, and broader gender equality. In cases of pregnancy-related death, the loss of life has far-reaching consequences for communities, in addition to its effect on families. Communities lose individuals whose social, economic, and caregiving contributions may have had a significant impact on collective wellbeing.

Economic Impacts on Society

Maternal mortality and morbidity carry serious economic consequences; yet there is limited research regarding the exact economic impact in Tennessee. Given that Tennessee reports some of the highest rates of maternal mortality and morbidity (Joyce et al., 2025; March of Dimes, 2025), the associated economic burden is likely considerable. Pregnancy-related illness and mortality contribute to lost workplace productivity, reduced household income, and diminished lifetime earnings, increasing financial instability for affected families. These economic disruptions may contribute to cycles of poverty and greater reliance on public assistance programs. Additionally, adverse maternal health outcomes are associated with high healthcare expenditures (Declercq & Zephyrin, 2021). Chronic conditions caused or exacerbated by pregnancy can lead to long-term medical expenses which may place burdens on programs like TennCare. Given the established preventability of many adverse maternal health experiences (Tennessee Department of Health, 2024), early intervention represents a critical opportunity to reduce avoidable healthcare costs.

Rationale for Doula Programs

Doulas are nonclinical professionals who provide critical support to birthing individuals across the maternity care continuum, including pregnancy, childbirth, and postpartum (Sobczak et al., 2025). While this form of support is sometimes undervalued, inadequate support during pregnancy is associated with elevated birth risks, including preterm births and low infant birth weight. As nonclinical providers, they complement existing clinical care by mitigating many individual and family level challenges associated with adverse maternal health outcomes including lack of agency in medical settings, insufficient communication, and limited support. Doula care is associated with lower rates of PPD and postpartum anxiety (PPA), as well as lower rates of preterm and cesarean births (Falconi et al., 2022). Evidence also shows that doula support may reduce the need for pain medications during childbirth and improve breastfeeding outcomes (Sobczak et al., 2025). The continuum of care through the postpartum period could be especially consequential considering 71% of pregnancy-related deaths in Tennessee occur during this time (Tennessee Department of Health, 2024). Doula support has been associated with improved parent—child bonding and may contribute to improved maternal health outcomes, in addition to potential economic benefits.

Although doula care requires additional upfront costs, their support is associated with improved maternal outcomes and reduced reliance for costly medical interventions. Kozhimannil et al. (2016) demonstrate an average of $986 in per-birth savings associated with doula support. This is due in large part to a reduction in preterm births, which cost ten times as much as full-term births, and a reduction in caesarean births which cost twice as much as vaginal births. Doula support may also reduce the necessity of requiring Neonatal Intensive Care Unit (NICU) admission. In New Mexico, doula care prevented one NICU admission per every 1,000 births, which translated to a potential savings of $76,164 per 1,000 births (Tewa Women United, 2020). In Tennessee, doula care could prove to be especially consequential where healthcare provider shortages and access barriers limit continuity of care. It is also worth noting nearly half (46.7%) of live births are covered by TennCare (March of Dimes, 2025), highlighting the potential savings for expanding access to doula care in Tennessee.

In addition to potential cost savings, doula support may also reduce healthcare disparities among marginalized groups by providing culturally-responsive care and supporting health literacy (Falconi et al., 2022). In addition to physical and emotional support, doulas provide informational support for birthing individuals. By serving as intermediaries between birthing individuals and healthcare providers, doulas can improve communication efforts and help ensure that birthing individuals understand risks and symptoms to be aware of regarding complications. Such communication can certainly help mitigate issues related to inequitable care and implicit bias among healthcare providers. This is particularly beneficial for Black women and individuals who speak different languages and face elevated maternal risks. Overall, existing evidence demonstrates doula care could be an especially cost-effective way to improve maternal health outcomes in Tennessee.

Proposed Intervention: Statewide Doula Service Expansion

To ensure that those who are most vulnerable to adverse maternal health experiences receive adequate support, TennCare coverage should be expanded to include reimbursements for doula services throughout pregnancy and up to a year postpartum. Equally important is ensuring that doula services are community-based and culturally responsive. Hiring doulas from within the communities they serve, particularly those with shared language and lived experience, can foster improved engagement between doulas and birthing individuals. Community-based doula programs can collaborate with hospitals and birthing centers to enhance care coordination and continuity while maintaining a focus on culturally responsive support. While doula services are not a substitute for medical care, the nonclinical support they provide strengthens perinatal services by addressing informational, emotional, and advocacy-related needs. Additionally, pilot programs that fund doula training in high-risk areas could expand the doula workforce and increase service availability in communities with unmet needs.

Social Work Role

Social workers are well positioned to contribute to statewide doula service expansion through policy advocacy, community engagement, and program evaluation. Because Tennessee currently does not offer Medicaid coverage for doula services, social workers can advocate for policy reform by engaging state lawmakers and communicating both the urgency of Tennessee's maternal health crisis and the evidence supporting doula care. Following policy implementation, social workers can facilitate community outreach by serving as brokers, connecting pregnant individuals with doulas and other essential healthcare services. After pilot programs are established, social workers can also play a critical role in evaluating program effectiveness. Relevant evaluation metrics include maternal mortality and severe maternal morbidity rates, maternal mental health outcomes, infant mortality and preterm birth rates, and cost savings. Clinical social workers may further support the intervention through collaborating with doulas and providing mental health screenings and counseling services to pregnant individuals experiencing SUD, depression, anxiety and other mental health conditions.

Theoretical Frameworks

Adverse maternal health experiences may be influenced by multiple systems as well as structural injustice. Ecological systems theory considers the connection between micro-, mezzo-, and macro-level systems (Reisch, 2019). The reproductive justice framework positions interactions across these systems within histories of inequality, contested bodily autonomy, and healthcare disparities (Hall et al., 2023). Doula care represents a promising approach to reduce the impact of systemic failures while aligning with reproductive justice principles.

Ecological Systems Theory

Ecological systems theory explores how micro-, mezzo-, and macro-level systems are interconnected (Reisch, 2019). From this perspective, the individual, or micro system, is influenced by familial and community contexts at the mezzo level, as well as by broader social, economic, and policy environments at the macro level. For birthing individuals, maternal health experience is not only affected by personal health status, but also by access to social support, housing, transportation, and healthcare services. When systems function in a way that promotes health and well-being, adverse maternal health experiences may be less prevalent.

Doula care may mitigate challenges caused by dysfunction across these interconnected systems (Sobczak et al., 2025). Emotional and appraisal support provided by doulas can be particularly beneficial for those with limited familial or community support or for those experiencing depression or anxiety. Additionally, informational support provided by doulas may promote maternal health and foster clearer communication between pregnant and postpartum individuals and healthcare providers. This support can enhance understanding of medical concerns and increase the capacity to respond to potential complications. It can also connect birthing individuals and their families to needed resources in their communities. Finally, the advocacy role of doulas may reduce the effects of broader systemic issues, including discrimination and the quality of healthcare.

Reproductive Justice Framework

The maternal health crisis in Tennessee raises serious social justice concerns that may be better understood through the reproductive justice framework. Reproductive justice recognizes that bodily autonomy, including the decision to have or not have children, is a human right that is fundamental to personal and societal safety (Hall et al., 2023). This framework emphasizes the importance of access to comprehensive health services, including abortion, which can be necessary to prevent maternal mortality and severe morbidity. It also underscores the importance of safe, supportive, and accessible environments for childbirth. Tennessee's high maternal mortality rate therefore raises serious questions about maternal safety and reproductive justice within the state.

The reproductive justice framework further highlights how maternal health experiences are shaped by social determinants such as race, gender identity, sexual orientation, and healthcare accessibility (Hall et al., 2023). As previously stated, the maternal mortality rate among non-Hispanic Black women in Tennessee is nearly double the rate of non-Hispanic White women (Tennessee Department of Health, 2024). Moreover, differential treatment from healthcare providers was a contributing factor in over a third (35%) of pregnancy related deaths from 2020 to 2022 in the state. According to the MMRC, differential treatment was most often linked to racial discrimination, while mental health conditions and obesity were also identified as commonly associated factors. These disparities demonstrate a need for maternal health interventions that explicitly center reproductive justice.

Birthing individuals may not always have meaningful autonomy in their reproductive healthcare, reflecting broader patterns of systemic injustice. Expanding access to doula care may mitigate some of these issues (Johnson Searcy et al., 2025). Through continuous, individualized support, doulas advance reproductive justice by centering the needs of pregnant and postpartum individuals. This is meaningful in medical environments where efficiency may be prioritized over quality of care or implicit bias is present. Such support may be critical among marginalized groups in Tennessee who are most vulnerable to adverse maternal health experiences.

Cultural and Ethical Considerations

Expanding access to doula care by investing in community-based programs, funding pilot initiatives in high-risk areas, and requiring TennCare reimbursement may improve maternal health outcomes. However successful implementation requires careful attention to cultural and ethical considerations. Prioritizing communities with the greatest need is essential, as is clearly defining the role of doulas within the broader healthcare system. Doula care should complement, not replace medical care, by enhancing decision making power and agency for birthing individuals. Policies designed to expand access to doula care must therefore be implemented in ways that do not introduce new barriers or unintended consequences.

Tennessee House Bill 0295/Senate Bill 044, proposed by State Representative Love and Senator Lamar would require TennCare to reimburse doula services and establish training and certification requirements for individuals seeking to practice as doulas (Tennessee General Assembly, 2025). While this policy represents a meaningful step toward expanding access, certification requirements may pose financial barriers that limit the availability of doulas in economically disadvantaged communities—those already facing higher maternal health risks. To mitigate this concern, pilot programs in high-risk communities should consider funding certification costs to support workforce development and equitable access to doula care.

Addressing Disparity

In Tennessee, Shelby County faces the highest rates of pregnancy-related deaths (Health Resources and Services Administration, 2025) and is home to the largest population of Black residents in the state (National Institute on Minority Health and Health Disparities, n.d.). This pattern reflects broader racial disparities in maternal health driven by systemic and structural inequalities (Sonderlund et al., 2021). Implementing a pilot program for doula care in Shelby County would direct resources to a community with demonstrated need and may lower maternal mortality and morbidity while helping to mitigate racial health disparities.

Alignment with Social Work Values

The National Association of Social Workers (NASW) Code of Ethics emphasizes the “inherent dignity and worth” of all people (NASW, 2021, p. 11) and calls on social workers to respond to social injustice, including health inequities. Efforts to expand doula care align with these ethical principles and may be further strengthened through social work advocacy and collaboration. Social workers in Tennessee can support this intervention by engaging policymakers, advocating equitable implementation, and partnering with community-based organizations addressing adverse maternal health experiences. By centering community-led solutions and existing strengths, social workers and doulas can contribute to more equitable maternal health outcomes across the state.

Limitations

This study relies on secondary data; therefore, findings are subject to limitations related to interpretation of data from these sources. Additionally, much of the evidence supporting doula programs is still developing. State-funded doula programs were first implemented in 2014 (Chen, 2024), and the limited duration of programs restricts the availability of long-term outcome data. Though existing research does suggest encouraging associations between doula care and improved maternal health outcomes, the current available research is limited highlighting the need for continued research.

Conclusion

Tennessee currently experiences the highest rates of maternal mortality in the United

States as well as high rates of severe maternal morbidity (March of Dimes, 2025). These outcomes disproportionately affect marginalized groups, including Black birthing individuals, who face the highest risks (Tennessee Department of Health, 2024). The severity of these problems underscores the need for system level change that addresses both clinical and social determinants of maternal health. Expanding access to doula care represents one strategy among many to promote maternal health and safety. Doula programs have the potential to be both lifesaving and equity-focused while remaining cost-effective, as demonstrated by initiatives in New Mexico (Tewa Women United, 2020). Research shows doula support is associated with lower rates of costly medical interventions, lower preterm births, and improved maternal mental health outcomes (Falconi et al., 2022).

By contextualizing doula care within ecological systems and reproductive justice frameworks, Tennessee can implement culturally responsive, targeted interventions that reduce disparities, enhance maternal safety, and advance social justice within the state's maternal healthcare system. Much future research is needed to assess implementation outcomes of TennCare-funded doula programs in Tennessee, particularly in relation to racial disparities and postpartum mortality.

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Temporal Hierarchies in Music and Neural Timing: An Exploratory Review

Elizabeth Lawrence

ABSTRACT

Predictive, hierarchical relationships in temporal experience are fundamental aspects of both music and language—vehicles of communication essential to human social bonding and survival. This exploratory review considers music as a lens through which to explore neural timing, examining research in music cognition spanning four decades. The paper describes and synthesizes findings on how humans track, predict, and actively respond to hierarchical temporal structures in music, considering what these layered, multisensory mechanisms can reveal about human cognition and communication on a broad level.
A limitation to this exploration, albeit relevant in conveying the material to the reader unfamiliar with the field, is the concept of "groove" as an overarching construct. The study aims to employ more precise terminology to accurately capture the subject of interest. Additionally, it is proposed that future music cognition investigations prioritize (1) ecologically valid designs supporting naturalistic social interactions; (2) whole-body movement as central to temporal perception; and (3) multisensory integration. These considerations situate music cognition research in a meaningful position for translatable, interdisciplinary and cross-cultural application, contributing to a greater understanding of the multimodal, temporal underpinnings that support human communication.

Introduction

Predictive, hierarchical relationships in temporal experience are fundamental aspects of music and language, serving as ubiquitous vehicles of communication, essential in facilitating social bonding and survival. Through these neural processes, complex information is integrated across multimodal systems (e.g., auditory, visual, vestibular, kinesthetic, and motor), contributing to the perception and production of temporally-bound stimuli. Successful perception, expression, and information exchange hinges on the ability to process, produce, and synchronize multiple streams of information that are, at their core, rhythmic. Using music as a lens through which to explore neural timing and temporal processing provides a useful perspective in the understanding of these hierarchical frameworks in an effort to advance research on human communication and cognition.

The time aspect of music—involving beat, meter, rhythm, attending, and entrainment—may be described as event-based phenomena eliciting predictive oscillatory processes in the listener: a temporal concern. This review conducts an exploration of time- and event-based investigations of music cognition across fourteen works and several decades of research. Studies were selected based on their focus on temporal processing in music cognition as identified through literary review and research in an independent study conducted at Middle Tennessee State University (MTSU) in Summer 2025, with one additional study conducted in Winter 2026. Selection prioritized empirical studies of rhythm, meter, beat perception, and temporal attention, alongside foundational theoretical works in music cognition. The intention of this review is to synthesize investigations of temporal processing in music cognition, identify limitations in current music science approaches (particularly, the repeated use of "groove" as a catch-all construct), and consider a framework for future directions in music science that can prove translatable in the interdisciplinary study of language and communication.

Table 1: Comparison of published works explored in this literature review

Author	Year	Design	N =	Form
Desain and Honing	1989	Theoretical Model	N/A	Article
Duman et al.	2024	Experimental Design	88	Article
Henry et al.	2025	Registered Replication	60	Article
Hickock et al.	2015	Experimental Design (2)	5; 3	Article
Huron	2006	Meta Analyses, Theoretical Exploration	N/A	Book
Kalender et al.	2012	Experimental Design	56	Article
London	2004	Meta Analyses, Theoretical Exploration	N/A	Book
Palmer	1996	Case Study	1	Article
Povel and Essens	1985	Experimental Design, Theoretical Model	N/A	Article
Jones et al.	2002	Experimental Design (3)	21; 21; 11	Article
Spiech et al.	2024	Experimental Design	30	Article
Stupacher et al.	2025	Experimental Design	35	Article
Witek et al.	2014	Experimental Design	66	Article
Wu et al.	2025	Experimental Design (4)	30; 30; 31; 32	Article

Within the fourteen works reviewed, all of which were directed towards audiences within areas of music theory, music psychology, or cognitive neuroscience of music, a variety of experimental designs were used. As shown in Table 1, three of the included works were theoretical or written as meta-analyses, eleven of the works were experimental studies (including one registered replication study and one case study) with stated hypotheses, methodology, procedures, and reported findings. The experimental studies ranged from a single case study to an online study with 88 participants in total. These publications spanned many topics involving investigation of music theory and expressive choice (Palmer, 1996), psychology of musical expectation (Huron, 2006), a study of rhythmic entrainment and perceptual oscillations with a follow-up registered replication study reporting countering results (Hickok et al., 2015; Henry et al., 2025), perception of musical meter (Kalender et al., 2012; London, 2004; Povel & Essens, 1985), dynamic attending (Jones et al., 2002), computational modeling methods representative of musical time (Desain & Honing, 1989), eye blinks synchronizing to the beat as a biobehavioral marker of temporal attending while listening to music (Wu et al., 2025), and experimental studies investigating concepts related to movement, "groove," and syncopation (Duman et al., 2024; Spiech et al., 2024; Stupacher et al., 2025; Witek et al., 2014).

The scientific literature within this review exploring "groove," defined as "the pleasurable urge to move to music," (Janata et al., 2012), investigates different facets of the described phenomenon through the lens of cognitive neuroscience, clinical application in substance abuse disorders, and a redefining of the concept (Janata et al., 2012; Duman et al., 2024; Spiech et al., 2024; Stupacher et al., 2025). As psychological investigations of this concept are synthesized, "groove" as it is typically defined serves to be a useful paradigm for music science investigations. However, there is ambiguity in the term's meaning, complicating its use in scientific studies (Duman et al., 2024). Nuanced meanings of the term "groove" may be particularly unique to different generations, cultural groups, or professions (e.g., professional musicians). These inconsistencies complicate data collection, interpretation of results, and communication of findings, further narrowing the potential investigations of the multilayered, complex rhythmic and oscillatory phenomena of interest. As this review explores various facets of rhythm, meter, and temporal perception in music, I critically examine the "groove" and propose a more precise and integrated terminology.

Investigating Musical Notation and Expressive Choice

As a starting framework, consider how humans superimpose expressive choices and patterns on music as they perform, as is the case in Palmer's 1996 case study. This study utilizes statistical analyses to disentangle expressive performance choices made by an expert performer that are not explicitly indicated in the musical score of a Mozart piano sonata. This research provides background information on the landscape of music cognition studies of the 1990s, indicating that the study of interaction between music and human communication should involve the study of physical or recorded performances rather than use of a score to quantify the stimuli and its effects. While the study lacks generalizability and employs a relatively small sample (N = 1), the hypotheses investigated extracted evidence of an expert musical performance delineated from the score through interpretation of notational information (e.g., dynamic choices between notes of different pitches), performance-specific sources of expression (e.g., instrument-related timing tendencies), general characteristics of performance expression (e.g., microtiming of note onset choices in dissonant vs. consonant chords), performer-specific expression (e.g., choices of timbre/resonance), and cultural/cognitive norms (e.g., prediction of tension-relaxation and melodic expectancy influencing dynamic and timing choices).

This case study posed novel hypotheses related to human musical expressive choice and opened many questions for further investigation into expressive choices made by performers and perceived (either consciously or unconsciously) by listeners. Through the lens of cognitive neuroscience, it is apt to ask what may be learned through investigating how humans process and transmit musical—or communicative—expression and how it differs from its source, whether a written score, an audio transmission, or other media source. The ways a performance differs from a musical score may uncover social and cultural expectations in emotionally expressive timing, communicative patterns in timbre, and decision in microtiming. Since music and language are both vehicles of expressive communication, there are crosscurrents in unwritten expressive choices occurring in written and spoken language as well, such as prosodic inflection in a reader, which correspond to musical expressive choice. While the differences between reading music and written words involve distinctive neural processes and cross-cultural considerations, this context can be leveraged to identify individual expressive choice (or the lack thereof) to be conceptualized as a form of cultural transmission, neurotype, or phenotype associated with different neurological conditions or health considerations. Generally, findings from music-language comparisons can shed light on the neural mechanisms underlying communicative expression and point to rehabilitative strategies for those facing communication-related developmental challenges.

A Theoretical Framework for Musical Expectation

Mental representations of predictability, expectation, and the element of surprise in musical experience have been notably investigated by Huron (2006), whose elegantly simple framework identifies different types of expectation and surprise in a musical context. His proposed concepts name four categories relating to musical expectation and surprise, which can be fluid and may shift in interpretation depending on the listener's exposure and experience with a musical work. Huron's four categories of expectation are: (1) Schematic: involving expectations emerging from an existing schema that a listener brings to their experience of a musical work; (2) Dynamic: involving expectations that are created within the context of the musical work; (3) Veridical: involving the use of musical forms or sounds that are unexpected and found in other domains; and (4) Conscious: involving verbalizable knowledge, such as knowing the song order of a favorite album.

Huron's recapitulative point that "the biological purpose of memory is not recall, but preparation" (Huron, 2006, p. 219) is an important reminder for scientific investigators to consider memory skills and memory processing differences when exploring concepts of event-attending, oscillatory rhythmic and meter entrainment, and patterns of social timing. Individual and clinical differences in attentional focus theoretically will lead to individual differences in memory. Populations with divergent attentional or memory experiences (e.g. post-traumatic stress disorder, attention-deficit hyperactivity disorder, autism spectrum disorder, Alzheimer's disease) may show identifiable behavioral or neural signatures of event preparation and surprise, perhaps further benefitting from tools leveraging musical expectation and surprise as metrics for identification and therapeutic use. While Huron's work is theoretically rich and poses several open-ended questions in the realm of memory, attending, expectation, and surprise, though herein we bracket the discussion of follow-up works to dive deeper into current neuroscientific explorations of these phenomena.

Initial Study and Replication Study: Exploring Rhythms in Perception

A study exploring human entrainment to acoustic rhythms reported that perceptual oscillation was effectively induced in listening participants for at least two cycles after the cessation of the rhythmic stimulus in which $N = 5$ and, in a follow-up experiment extending up to four cycles, $N = 3$ (Hickok et al., 2015). The findings of the study show positive indications of perceptual sensitivity oscillating after rhythmic auditory stimulation, though the analyses were limited by low statistical power. A multi-lab registered replication study published 10 years later with N = 60 did not find the same results and concluded that while neural entrainment remains a valuable concept, the behavioral signature reported in the original study might be weaker or less reliable than initially suggested (Henry et al., 2025). This pair of studies exemplifies the complexities of studying neural entrainment and the importance of transparency, replication, and clarity in identifying and reporting study limitations alongside results. While the replication study has significantly higher statistical power, a limitation of both studies is the lack of neural measurements in the experimental procedure. Future investigations exploring these hypotheses would benefit from implementing neural measurements in addition to replication of original behavioral measures, thereby illuminating the nuanced differences between the original and the replication study's findings.

Movement, Groove, and Syncopation Studies

When viewed through the lens of cognitive neuroscience, research on "groove," which has been defined in the psychological sciences as the pleasurable urge to move to music, can call for investigations of oscillatory attention (Spiech et al., 2024) and attempt to disentangle the degrees of rhythmic syncopation most related to body movement and pleasure in study participants (Witek et al., 2014). In clinical application, one study explored hypotheses related to the experience of groove in complex musical stimuli for populations with substance use disorders (Stupacher et al., 2025). Limitations of these studies include the use of simple drum stimuli, which may not be ecologically relevant to movement or dance-based musical activities, as well as terminological generalizations of rhythmic stimuli and reporting (e.g., using "syncopation" to describe rhythms that could be described more accurately using more nuanced language), hindering comprehension and translation of the work across different domains of academic research.

Future directions for studies in this realm include exploring tonal and melodic characteristics of music that may mediate or modulate a desire to move to music. Previously referenced scholarly work exploring anticipation and surprisal in musical experience provides ample hypotheses applicable to tonal expectation (Huron, 2006). As noted by Witek, moving to music inherently changes the aural experience of music. Further exploration of this phenomenon is a promising area of investigation that could have implications for applied work in brain-based processing and movement disorders.

A study by Duman et al. (2024) investigates the currently accepted, working definition of "groove," pointing out gaps in how participants interpret the term and how the term is applied to use in the psychological and brain sciences. Duman's study concluded that groove might be better identified as a "multidimensional participatory experience" (p. 93), marked not only by a pleasurable urge to move physically, but to mentally participate as well. The provides evidence that the experience of groove is a valid category for inclusion in the lexicon of the psychological sciences, though it still awaits a more encompassing definition and a set of sub-terminologies to adequately describe its multidimensionality as an experiential phenomenon.

Perception of Musical Meter

Three papers in this review relate to perception of musical meter. London (2004) provides a comprehensive theoretical background of the foundational psychological research supporting current explorations of time perception, dynamic attending, and entrainment. He proposes that meter and accent are entraining and attending processes for listening individuals, involving the development of a temporal schema based on past auditory events and prediction of future ones. Similarly, Povel and Essens (1985) characterize meter as hierarchical. Further, it has been found that metrical accents, while not present in stimuli, can be imposed by the listener (Brochard et al., 2003). These foundational concepts are interwoven throughout the more current research explored in this review, revealing a robust discussion on the role of meter in the perception of music and its relationship to temporal expectation.

Kalender et al. (2012) reports the results of an experimental study examining the influence of unfamiliar musical meter on a listener's ability to perceive a deviation from an established, repeated metrical meter. The participants in this study were stratified into groups described as "mono-musical" (familiarity with one musical tradition and meter, e.g., Western, Turkish, or Indian) and "bi-musical" (familiarity with two or more musical traditions and meters). The experimenters accounted for bilingualism and musical training in their analyses. Grouping the participants in this way introduces several lines of inquiry related to temporal experience in mono-musicality, bi-musicality and the perceptual narrowing of novel musical meter throughout an individual's developmental trajectory. The study reported that adults who listened exclusively to Western music detected changes in simple meter of Turkish music but not complex meter. Simultaneously, adults who listened occasionally to Indian music detected metrical changes in both simple and complex meter in Turkish music. The study is well-situated in cognitive neuroscience and music cognition literature, as it indicates that prior music experience significantly impacts the processing of meter cross-culturally. However, the results demand further illumination on the concept of bi-musicality. While the term implies a conceptual parallel to bilingualism, music and language involve distinctly different processes of exposure and absorption. Further investigations devoted to the nature of bi-musicality, and how it differs from bilingualism, could yield beneficial results for future work.

Povel and Essens' 1985 study investigates the ways that humans perceive and structure temporal patterns in rhythmic sequences. The cognitive framework proposed involves a listener's imposition of a mental "clock" that organizes time intervals into predictable patterns. Through three experiments, the authors explore how experiences of regularity, accents, and timing deviations affect rhythm perception and synchronization. The 1985 study left a definite legacy on subsequent studies of temporal and metric patterns, as it established how internalized time structures guide perception and reproduction of complex temporal patterns.

Dynamic Attending to Auditory Rhythms

A study by Jones et al. (2002) explores how rhythmic timing in auditory sequences influences attention and pitch perception. Across three experimental designs, the authors tested whether listeners' accuracy in judging pitch was affected by the timing of tones in a sequence. The results of the study support a model of dynamic attending, where attention aligns with predictable temporal structures. The study provides a robust illustration of the landscape of psychological literature in the realm of music cognition and psychological mechanisms of prediction and expectation at the time of publication. While the paper was published in 2002, scientific explorations continue to further expand on theories related to dynamic attending theory in the realm of auditory and cognitive neuroscience.

Wu et al. (2025) examine auditory-motor synchronization during musical experience, reporting a novel finding that unconscious eye blinks in EEG experiments are found to synchronize with a musical beat, controlling for tonal differences and tempo changes. Across multiple experiments, the strength of synchronization was found to be modulated by auditory attention. Stronger neural beat tracking resulted in more synchronization of blinks. These findings underscore the importance of developing experimental designs to identify the multimodal underpinnings of temporal tracking and auditory attention. New avenues for further refinement and exploration emerge, such as the examination of unconscious blinks as a biomarker for temporal attending in non-isochronous stimuli, as in naturalistic speech and speech-in-noise conditions.

Computational Representation of Musical Time

Desain and Honing's study (1989) represents a unique work in this review, as it centers on providing a novel, theoretical computational framework to represent the quantization of musical time. While this paper is primarily concerned with computational analyses, it is of additional interest to cognitive scientists working to disentangle musical time in perceptual experience related to application in user experience, psychological and cognitive science, and artificial intelligence research. The study proposed a framework of musical time operating on two separate time scales: beat-based (smaller) and expressive-based (larger), applying a connectionist approach consisting of interconnected elements within a complex network. At the time of publication, this method outperformed other approaches and represented a landmark contribution to the field.

The Problem of "Groove" in Music Science

The term "groove" appears frequently in music cognition literature, as explored in this review and beyond. Duman et al. (2024) report the results of an online study analyzing participants' understandings of the word "groove" throughout musical experience, i.e. what the associations the term "groove" evokes for listeners. Results overlap with the current definition of groove in the psychological sciences, and can be further expanded into territories related to solely mental experiences. Such findings could steer researchers towards considering Duman et al.'s proposed definition of a "multidimensional participatory experience" (p. 93) involving mental as well as physical engagement by the listener. New pathways emerge for investigations of attending, pleasure, and participatory engagement in musical experience. While the desire to move and participate in music is an intriguing concept to explore—in music cognition and cognitive neuroscience research—I propose that solely using the term "groove" to describe the phenomenon remains insufficient and overgeneralized.

Terminological Precision in Music Science Research

The limitations of language-based categorizations on human perception and experience are meticulously documented in seminal works throughout the field of psycholinguistics (e.g., Lakoff and Johnson, 1980). Since early uses of the concept of musical "groove," the term has been loosely defined, subjectively experienced, and globally popularized. While more research is needed, it is a valid concern that music cognition investigations attempting to contribute to an understanding of "groove" will face interpretive and translational challenges by relying on ambiguous terminology.

A large, multi-lab study deconstructing multiple aspects of "groove" into distinct, underlying constructs, such as rhythmic entrainment, motor affordance, affective engagement, and temporal attending, could more accurately describe the varied multidimensional experiences underlying the "pleasurable urge to move to music." Drawing on movement science frameworks like "affectively-charged motion states" (ACMS) and "psycho-physiological drive" (Stults-Kolehmainen et al., 2022; Stults-Kolehmainen, 2023) could inform components of this deconstruction and bridge terminology across relevant fields.

Toward Multidimensional, Predictive Temporal Hierarchies

Considering the perspective of an experienced musical performer accustomed to isochronous time and micro-timing of familiar meters, a worthwhile investigation for additional theoretical framing would explore the emergence of nonlinear, cross-hierarchical temporal expectations and tensions that occur simultaneously during music performance. Exploring these phenomena could further reveal more nuanced and complex hierarchical experiences of schematic, dynamic, and veridical expectation, in addition to surprisal experienced by those with primed memory and motor systems for such an experience. The phenomena could be further applied across variable domains such as cultural context, lifetime musical exposure, language experience, motor affordance, and affective states. Studying psychological musical phenomena while considering the impacts of individual differences using physiological neural measurements can yield more direct terms applicable to the experiences of these populations, perhaps guiding the definition of "groove" into new subcategories and conceptual domains, revealing the plurality of overarching, dynamic processes occurring in human musical experience.

Future Directions: Temporality, Neural Timing, and Human Communication

While this review has focused on temporal experience in music, the importance of temporality and neural timing in human language and communication is paramount. Musical timing is often beat-based (isochronous) and hierarchically categorized using simple frequency ratios, whereas speech timing contains hierarchical and non-isochronous rhythm and stress patterns, known as prosody. In both speech and music, the precisely timed coordination of sensorimotor gestures, facial expressions, head movements, and eye contact are crucial to conveying highly specific, meaningful messages. This poses the question: how do hierarchical rhythmic structures in music and language support multimodal communication and entrainment in social interactions? Further, what can this tell us about the neurobiological mechanisms underlying these processes?

The complex neurobiological processes underlying communicative timing enable elaborate and successful interpersonal information exchange—a vital skill for social cohesion and survival in all living species. While rhythmic processing in both music and language at least partially distinct, these processes are also known to share neural mechanisms and genetic architecture (Barchet et al., 2024; Alagöz et al., 2025). Recent studies exploring the multimodal underpinnings of language and music emphasize the need for ecologically valid study designs incorporating whole-body movement (e.g., co-speech gesture, beat gesture, posturing, and dance) and dyadic or group interactions (e.g., caregiver and child interactions, synchronization, speech-in-noise recognition) in temporal analyses. These investigations could contribute to a more comprehensive understanding of how afferent and efferent neural pathways support prediction and temporal attention, calling on multiple sensory systems to track, interpret, and express communicative messages (Hartmann et al., 2023; Momsen, 2024; Wu et al., 2025).

Prioritizing an investigation of temporally-driven, hierarchical frameworks across both music and language will be instrumental in disentangling the distinct and shared neural timing mechanisms across both modalities. This approach calls for (1) ecologically valid study design within naturalistic dyadic and group interactions, (2) the consideration of whole-body movement as central to temporal perception, and (3) multisensory integration.

Differences in temporal processing are implicated in a range of neurological conditions involving altered predictive coding, reduced multisensory integration, atypical memory functioning, and impaired motor abilities, all of which can cause difficulties in interpersonal communication. Across the human lifespan, a range of genetic and environmental influences can negatively affect the capacity for naturalistic communication and rhythmic processing, with downstream impacts at the level of the individual, family, community, and greater society. Contributing to a greater understanding of these temporal mechanisms across domains of language and music can inform future investigations and aid in the development of interventions for conditions involving impaired rhythm and communication skills.

Conclusion

This exploratory review, spanning fourteen works across forty years of music cognition research, has examined musical rhythm, meter, and temporal perception across a wide range of musical contexts and stimuli. While additional research is needed to cultivate understandings of cross-cultural and developmental musical phenomena, to establish greater terminological precision, and to explore neurophysiological measures that may support or refute aspects of currently adopted theoretical frameworks, the field of music cognition has made great strides in the last four decades. Pioneering studies have contributed to understandings that are deeply relevant to our collective understanding of perception, cognition, neuroscience, movement science, and human development.

To situate future music science research in an effective position for translatable, interdisciplinary application and cross-cultural collaboration, deconstructing ambiguous concepts and using precise language, (e.g., the concept of “groove”) to develop future hypotheses will be paramount. Additionally, music cognition investigations should consider adopting: (1) ecologically valid designs incorporating naturalistic dyadic and group interactions, (2) frameworks positioning whole-body movement as central to temporal perception, and (3) active inclusion of multisensory integration. These considerations can position new hypotheses and investigations towards exploring a greater understanding of the multimodal, temporal underpinnings that support human connection, communication, and expression. They further allow us to uncover the distinct and shared neural mechanisms involved in both music and language processing, and to inform therapeutic and clinical applications.

Working to understand temporal hierarchies across the domains of music and language has great promise in contributing to an understanding that supports populations facing communication challenges, memory differences, movement disorders, and differences in multisensory integration. By leveraging the clear similarities and differences in music and language, researchers can move towards multidimensional frameworks supporting multimodal perception and action through hierarchical temporal relationships. This will advance a greater understanding of human communication and connection—skills essential for social cohesion, communicative agency, and survival.

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Echoes of the Holocaust: Female Survival in *I Who Have Never Known Men*

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ABSTRACT

Author Jacqueline Harpman, who spent her childhood as a refugee fleeing Nazi persecution, wrote *I Who Have Never Known Men* in 1995. The novel follows the story of a girl growing up in captivity as she discovers what it means to be human through the guidance and strength of her fellow female inmates despite their bleak circumstances. By examining passages from Harpman's novel and historical accounts of life under Nazi occupation, this essay argues that Harpman in her novel pulls from testimonies and personal experience to intentionally parallel the female experience of the Holocaust. Further, Harpman's purpose behind crafting these similarities reflects her views on the patriarchy's threat to human survival, and how women's efforts towards community building and emotional endurance make women crucial to the continuance of a human race that has been compromised by patriarchal ideologies throughout history.

Jewish author and psychoanalyst Jacqueline Harpman was born in Etterbeek, Belgium in 1929, and fled to North Africa with her family to escape Nazi persecution as a young girl (Harpman 175). In 1995, she published the novel *Moi qui n'ai pas connu les hommes*, which has since been translated into English by Ros Schwartz under the title *I Who Have Never Known Men*. The story follows a young nameless female narrator as she grows up in an underground prison with thirty-nine older women. The group is strictly monitored by male guards who impose a rigid and dehumanizing structure upon them. With no memories of the world before her captivity, the narrator grows up figuring out her identity under the influence of her fellow inmates in an environment that seeks to deprive her of humanity. An inherently philosophical novel, *I Who Have Never Known Men* explores female-specific gendered trauma and gendered coping mechanisms, bears direct witness to the lives of Jewish women in Europe and throughout concentration camps during the Holocaust as they were subjected to the authority of a patriarchic Nazi regime. The female experience of trauma as a result of male abuse of power in *I Who Have Never Known Men* directly parallels Holocaust testimonies, suggesting that Harpman's perspective as a female Jewish refugee informs her beliefs about survival – particularly her conviction that the human race is threatened by the patriarchy and instead must be sustained through the emotional and communal endurance displayed by women in hardship. For Hartman, the female sex is essential to the preservation of humanity in the face of patriarchal goals.

Gender in Europe

The dystopian world Harpman crafts in *I Who Have Never Known Men* displays clear traces of early twentieth century Europe in context of the Holocaust, equally capturing both European gender roles and the desolation of ethnic cleansing. Preceding the war, Jewish men and women followed traditional gender patterns across Europe, which led to separate gender spheres wherein women's education and social networks were limited, culminating in fewer non-Jewish connections for women to protect them during Nazi persecution (Ofer and Weitzman). In some areas of Eastern Europe, gender roles were less rigidly divided, allowing women more avenues for economic and educational opportunities, which provided them with more connections for protection and escape during the war. Women were also at higher risk for persecution. Early in the war, it was common belief among Jews that the Germans would not harm women and children; therefore men were given priority in plans for hiding and exit visas, which led to a disproportionate representation of women in deportations to Auschwitz (Ofer and Weitzman).

In her novel, Harpman parallels early twentieth century European culture and gender dynamics in the stories women share with the narrator about their lives. All but one of the forty women are uneducated, and all come from backgrounds as either stay-at-home mothers, retail and factory workers, or waitresses, similar to women in early twentieth century Europe (Harpman 70). The lack of education among female inmates in the novel could suggest one of two things: that vulnerable women with limited social spheres were intentionally targeted, or that educated women had more resources to escape persecution, leaving mostly uneducated women to fall victim to the unknown forces that imprisoned them. Another element suggesting the novel intentionally imitates the Holocaust is the methods by which the women were forcibly taken from their homes and imprisoned. The women vaguely recall recent political tensions and war preceding a night of terror, fire, stampedes, and screams wherein they were stolen from their homes, drugged, and placed inside the underground prison (Harpman 46-47), which is directly reminiscent of Kristallnacht. During their time in the bunker, the women are surveilled by male guards, suggesting a continuance of a male-dominated structure that governed their lives before, much like how Nazism was characterized by its patriarchal values – "A second difference in the German treatment of men and women was their consistent (and traditional) pattern of delegating leadership roles to men" (Ofer & Weitzman).

Setting and the Concentration Camp

The bleakness of the novel's setting additionally carries heavy connotations that Susan Bainbrigge explores in her 2010 article on literary fantasy and setting liminality in Harpman's work. The flat world setting the women find themselves in after escaping the bunker is intentionally despairing. It is marked with sparse vegetation and homogeny among what little plant life there is. The stars in the sky form no familiar constellation and the seasons never change as the women come to understand they are the only people alive on this terrain. The women have little reference to understand their land, which is deprived of most of the life that would be found on Earth, and each insight they gain breeds more confusion than it does answers, with the narrator even equating their environment to "...a new prison" (Harpman 63). The women can find no escape, and they are forced to continue living without true freedom until they all die out. Bainbrigge equates Harpman's bleak landscape and structure with the guards as being "...more in common with the universe of the concentration camp than that of the fantasy novel" (Bainbrigge 1015-1016). This otherness of setting reflects the absence of humanity found in the goals of Nazism, which Harpman experienced firsthand living as a refuge in Casablanca as a young girl, which she parallels through the narrator's isolation; the novel even begins with the narrator being approximately the same age Harpman was when her family fled Europe. While Harpman did not experience life in the concentration camps, she personally felt the impacts of the genocide of Jewish people, giving her an understanding of what it's like to be denied identity and means of survival, which thematically defines I Who Have Never Known Men.

It is certain that in her return to Europe and the half-century that elapsed between World War II and the publication of her novel, Harpman encountered concentration camp survivors and heard their testimonies, as well as likely lost family and friends during the Holocaust, giving her an even deeper understanding of life in concentration camps to inform her novel. Her participation in a communal pain and healing of Jewish survivors following the war arguably shaped her thinking about the essential needs of human survival, where emotional endurance and collective actions guide our persistence as a species. Her perspective as a woman subjected to the inconceivable harms of the patriarchic Nazi regime perhaps influenced a guiding belief that, under threat of survival, women focus more on sustaining emotional relationships and nourishing collective needs rather than violence and self-preservation. The mental perseverance demonstrated by the female community as they die out due to circumstances constructed by authoritarian males in Harpman's novel reflects her views about the necessities of human survival in the face of horrors created by fellow man. With this, it can be said that the Holocaust perpetually lingers in the background of this text, not as a ghost, but as a solid and present authority which dictates Harpman's construction of the novel, where she echoes the past of a patriarchally-ordained species genocide. The depravity created by men in Harpman's novel demands her exploration of the possibilities of human survival and flourishing in female communities which she illustrates as better equipped to meet human needs and sustain our survival as a collective species.

Gendered Trauma

While men and women were often subjected to the same kinds of harassment in labor and death camps, the female perspective interpreted some acts of humiliation and degradation differently due to cultural expectations of sexual violence towards women. Though men and women both were forced to strip in front of male guards, this produced far more fear and humiliation for women socialized in a culture of modesty and expectations of sexual assault (Ofer & Weitzman). The women in the novel are dehumanized by the male guards in a panoptic cage where they are forced to bathe and use the bathroom in plain sight, which is especially degrading in the male-female power dynamic where sexual exploitation and abuse is an underlying fear and expectation. They face further dehumanization and gendered trauma by not being provided menstrual products or underwear, forcing them to designate a portion of the fabric they are given for collecting blood, which they must painfully and awkwardly hold between their legs during their cycles, while also maintaining careful effort not to bleed onto their mattresses (Harpman 6). The trauma they face is distinctly gendered; while the intention behind the guards' treatment of them may not be aimed at their womanhood, it is clear that their needs as women are not a consideration of the male authority binding them to the cage that otherwise feeds and clothes them, evidencing a clear patriarchal power that neglects (or actively dismisses) female needs and perspectives. Through these details, Harpman highlights her argument that patriarchies impede human survival because they fail to view women as human.

Sexual trauma also plays a powerful role in Holocaust testimony. Laura Miñano Mañero discusses the haunting subtext of gendered abuse that is often unvoiced in the corpus of female Holocaust testimony. She describes textual and figurative silence and unreadability regarding gendered and sexual trauma that occurred during the Holocaust as a sanctuary wherein female Jewish survivors could protect themselves from the pain inflicted upon their bodies by the Nazis (Mañero 190-191). Harpman integrates this silence as a response to gendered trauma into *I Who Have Never Known Men* within two contexts: sex and motherhood. In their environment that is utterly absent of empirical reason, the women contemplate the purpose behind their captivity. Understanding the dynamic of being in a cage full of women of mostly child-bearing age guarded by all men, the women conjecture they are on reserve to be used for an unknown purpose, which connotatively reads as a reproductive objective that would, by default, demand sexual violence. Given their unspoken understanding, the women elect to not teach the narrator about sex, perhaps as a means to not clue the narrator into a collective fear of being kept for purposes of breeding. Some of the women gesture they do not teach her about sex because the narrator will never experience it therefore there is no reason she should know about it, while also maintaining a faux power dynamic over the narrator as gatekeepers of "forbidden" knowledge (Harpman 8). The character of Anthea is the only woman who acts as an educator for the narrator and elaborates on the role of silence the women employed in raising her – "'...we got into the habit of never going over our memories with you, we thought it would be bad for you'" (Harpman 29).

It is evident that the women raising the narrator recognized the potential to inflict pain upon her by telling her about things she would never experience, which would additionally protect her from experiencing gendered trauma. By growing up without knowledge of the potential for sexual violence, and finding the circumstances the women are subjected to as normal, the narrator is allowed to grow up almost androgynously – absent of the female perspective that would have likely made her time in the bunker more traumatic for her.

Beyond silence on the subject of sex, silence on motherhood is an even more glaring choice by the women in the novel. During the Holocaust, women and children were often the first to be executed at concentration camps, sometimes with mothers being among the few granted the choice to either endure slave labor or die alongside her children. Jewish women additionally were forcibly sterilized, and pregnant women were either killed or forced to have abortions in order to survive ("Motherhood | Spots of Light: Women in the Holocaust"). Most of the women in the bunker are mothers; however, they do not speak of their children and often shunned the narrator while she was young: "...They resented my being there alive while they had no idea what had happened to their own daughters" (Harpman 19). The silence the women both give to the narrator and have about their own children acts as their way of protecting themselves from the pain of acknowledging their children are likely either dead or also locked in a cage somewhere – "'They don't want to think about their children'" (Harpman 101).

The severed connection between mothers and their children adds an additional layer of gendered trauma the women endure in the novel. Their shunning towards the narrator and silence on motherhood is not the women's means of diminishing their love for their children but is their way of enduring the daily pain they feel of not being able to protect their young, reflecting the difficult choices mothers faced during the Holocaust. "Some mothers, impelled by the survival instinct, made decisions or took actions that clashed with the accepted social norms that govern the mother-child relationship" ("Motherhood | Spots of Light: Women in the Holocaust"). The gendered trauma that women endure is a result of the absence of space patriarchies hold for them. Harpman's perspective as a woman whose girlhood fell victim to and whose remaining life was defined by patriarchal Nazism informs this novel heavily, with the trauma women faced during the Holocaust being paralleled in *I Who Have Never Known Men*. These intentional parallels, particularly in the treatment of the female inmates by the guards, support Harpman's assertion that systems that do not accommodate the needs and perspectives of women are extremely flawed, as to do so would deny that women are human. In the novel, the female perspective becomes the forefront of how the inmates endure survival and raise the narrator – protecting her from gendered trauma while also maintaining silence about their own. Harpman ultimately argues with *I Who Have Never Known Men* that the female perspective, perhaps influenced by its endurance through gendered trauma, possesses a unique understanding about what is needed to survive, and that power-hungry men, who continually orchestrate genocides, whether through the Holocaust or by placing the population in underground bunkers to die, do not hold a perspective equipped to maintain the endurance of humanity as a whole.

Gendered Coping Mechanisms

While the women's trauma characterizes the inability of a male-centered power structure to sustain human needs and survival, the women's response to that trauma through gendered coping mechanisms evidences the ability of women to survive despite these difficult circumstances, suggesting women possess an understanding of human needs that allow them to survive both physically and mentally in the face of depravity. The ways the novel's women cope with their circumstances are arguably gendered or are at least informed by a female perspective that continually focuses on a collective survival rather than individual. The structures the women create and maintain in their captivity all revolve around the preservation of humanity and cohesion of a community that mirrors the gendered coping mechanisms Jewish women upheld during the Holocaust. As a response to the depravity found in labor and death camps, women responded uniquely from men by making efforts towards their personal hygiene, sewing new clothes to fit their bodies, and sharing recipes to cope with their hunger (Ofer & Weitzman). These things are all similarly done by the women in *I Who Have Never Known Men*. The women wash themselves with what little soap they are given and teach the narrator how to wash her genitals properly, demonstrating a continued effort to keep their bodies clean among dehumanizing conditions and extending that humanity to the narrator to protect her womanhood. They similarly assert power over their bodies by sewing together; one of the distinctions between humans and animals is clothing, thereby when the women choose to create and wear clothing under the scrutiny of the male guards, the women are not only restoring dignity stolen from them in their lack of privacy but are asserting that they are human. The lack of dignity afforded to them by the male guards is reinforced by the fact they must distribute a portion of their fabric scraps to create sanitary rags as the men otherwise do not provide them any (Harpman 22), leaving the rest of what they are given to have a sense of sacredness in their function of providing the women a sense of privacy and ownership over their bodies when they otherwise do not possess such authority and autonomy. This makes their act of collective sewing a powerful coping mechanism of their mental survival and assertion of their humanity, much like women during the Holocaust managed to do. While the women in the novel are never hungry like those in concentration camps, they still are similarly starving within their souls under their bleak circumstances. Despite this, the women continue to talk and nourish their relationships with one another through conversation, even if it is quite pointless. "Listening to their chatter, I was amazed – anyone would think they had the choice between several recipes and a variety of seasonings, whereas in fact they only had three large pots and water... I was surprised at how much they had to say, the passion with which they repeated the same thing in ten different ways so as to avoid accepting that they'd had absolutely nothing to say to one another for ages. But human beings need to speak, otherwise they lose their humanity" (Harpman 20-21). With their actions, which extend beyond the needs of physical survival, Harpman argues here that there exists a mental survival distinct from the needs of the body. While one can subsist on only nourishment of the physical, as the unknown patriarchal authority asserts by providing the women with food, shelter, and clothing, it is dehumanizing to live off only the means to sustain the body. To counteract this structure of survival imposed on them, the women create functions to support a mental survival that focuses on nourishing a community and restoring the humanity stripped from them by the men.

This novel further imitates the circumstances of female survival during the Holocaust through the women's relationships paralleling Lagerschwestern or "camp sisters." Lagerschwestern were close-knit communities of women that bonded with each other for assistance and strength in concentration camps; there is no equivalent term for men (Ofer & Weitzman). In the novel, once the women are free from the bunker and are allowed to touch each other and express emotions, the women form groups and couples, including one polyamorous triad (Harpman 105). The women create these sisterhoods and lesbian relationships to sustain their needs of emotional connection; maintaining relationships between each other asserts their humanity, such that they are human beings to be acknowledged and loved. During the Holocaust, where the threat of death was imminent and Jewish people lived in perpetual fear and harsh conditions, women came together to form their own sisterhoods, especially as they often were separated from their own families like the women in Harpman's novel are. This parallel between Lagerschwestern and the female relationships in Harpman's novel supports her assertion that women come together to support their survival as a collective, focusing on the needs of all rather than some, as the patriarchal authority in this novel does. Her replication of the means women during the Holocaust employed to survive points to her view that men and women view and treat survival differently; women are guided by mental needs on top of the physical, supporting emotional connection and fostering humanity through the ways they cope against the traumatic circumstances inflicted upon them. Harpman's perspective as a refugee during World War II greatly influences the ways she weaves the female experience of the Holocaust into this narrative without directly acknowledging it. In the understanding she has of how the Nazi patriarchy failed humanity, Harpman seeks alternatives in Holocaust testimony, where a perseverance against dehumanization was evident amongst the women she replicates in her novel's characters, highlighting Harpman's ultimate view that women possess a gendered understanding of what is needed for human survival, where a collective and emotional endurance is valued above simply keeping the body alive to suffer without humanity.

Conclusion

The novel's mystery behind the women's imprisonment and landscape they flee to bears a likeness to the inconceivability of the horrors of the Holocaust. As easy as it is to say there is no answer or reason behind such depraved human brutality, the default response of the sympathetic heart neglects to acknowledge the very real power of fascism as an influencing power of ideology and policy. The power that dooms the women to their life split between a prison cell and a barren planet is one based in patriarchy and shares glaring characteristics of Nazism. Harpman is quite intentional with crafting similarities between the text and Holocaust testimonies through an often-overlooked female lens, which is informed by her perspective spending her girlhood as a refugee, fearing persecution for being Jewish. Her understanding of the unique forms of gendered trauma and how women cope informs this text greatly, with *I Who Have Never Known Men* communicating a message about Harpman's beliefs on human survival. The ultimate takeaway from the text is that the strength women are forced to exhibit as a result of patriarchal oppression reveals their ability to endure threats to humanity through emotional and communal means, rendering women the crucial key to the survival of a human race continually threatened by patriarchal ideologies.

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A Dingo Ate My Baby: Dissecting the Injustice of the Lindy Chamberlain Case*

Elizabeth Kowalczyk and Shelby Mills

ABSTRACT

This paper examines the Lindy Chamberlain case as a cautionary tale of how flawed forensic practice, cognitive bias, and sensationalistic media coverage can lead to wrongful convictions. Using a case study approach that lays out the primary timeline, reporting, and later forensic reviews, the piece reconstructs the sequence of investigative and evidentiary failures that led to Lindy Chamberlain's 1982 conviction and its eventual reversal. Key findings show that unreliable, presumptive serology, mishandling and staging of physical evidence, and the overreliance on expert testimony all contributed to a distorted evidentiary record; simultaneously, gendered social expectations, religious rhetoric, and commercial media representation amplified public and judicial suspicion. The discovery of Azaria's matinee jacket and subsequent forensic reevaluation were decisive in overturning the conviction, demonstrating the consequences of both technical error and media bias. Drawing lessons to apply to contemporary practice, the paper argues for validation of forensic methods, routine use of confirmatory testing, careful evidencehandling protocols, and structured efforts to mitigate cognitive and social bias in both investigations and courtrooms. The Chamberlain saga remains a reminder that while technological advances such as DNA profiling and molecular bodyfluid identification enhance forensic accuracy, institutional safeguards and critical scrutiny of expert evidence remain essential to prevent miscarriages of justice.

***Deans' Distinguished Essay Winner**

Introduction

The Lindy Chamberlain case, famously known by the phrase "a dingo ate my baby," is more than a sensationalized legal saga. Rather, it is a lasting reminder of how scientific uncertainty, human bias, and media dynamics can conspire to convict the innocent. In August 1980, nine-week-old Azaria Chamberlain disappeared from a family campsite at Uluru in Australia's Northern Territory. Despite early findings consistent with a dingo attack, subsequent investigative choices, forensic misinterpretations, and public narratives centered on a purported "blood trail" that later proved unreliable (Streak, 2020). The result was Lindy Chamberlain's conviction for murder in 1982—a verdict that would be overturned only after the discovery of new physical evidence and a re-examination of the forensic claims.

This essay reconstructs the Chamberlain timeline and assesses the technical and social failures that resulted in a cautionary miscarriage of justice. Examining both the scientific errors and the social forces that shaped interpretation, we learn practical lessons to apply to modern forensic practices that emphasize confirmatory testing, transparent expert communication, validation, and systematic measures to reduce cognitive and cultural biases. The Chamberlain saga provides a stark reminder not to make the same mistakes twice.

Wrongful Convictions

In the U.S. today, over 1.9 million people are incarcerated (Global Statistics, 2025). Organizations like the Innocence Project estimate at least 1% of incarcerated individuals, about 20,000 people, are innocent (2011). Other experts suggest that the true rate may be as high as 2–10% (Grisham, 2006). Studies abroad find similarly unsettling figures. One survey reported that roughly 6–8% of prisoners convicted of murder or rape continue to assert innocence (Berger, 2018). These statistics, when multiplied by millions of defendants, indicate the probability that thousands could have been wrongfully convicted. The Chamberlain case reveals the gap between the judicial ideal and real-life consequences.

The Chamberlain Case: Facts and Timeline

In August 1980 Lindy and Michael Chamberlain were camping near Uluru, a sandstone rock formation in Australia's Northern Territory, with their three young children. They arrived at the campsite on August 16th, 1980; the next day nine-week-old Azaria Chamberlain went missing. Lindy reported hearing Azaria cry, then saw a dingo leaving the tent. She rushed inside and discovered that the baby was gone. Many campers later recalled hearing her anguished cry: "A dingo's got my baby!" (NMA, 2024). A massive search party was dispatched almost immediately after the initial reports rolled in. Days later, searchers found Azaria's bloodstained jumpsuit among rocks at the base of Uluru, with puncture wounds on the neck (NMA, 2024).

Although the coroner initially ruled that Azaria had been taken by a dingo, public suspicion and bias soon outweighed the evidence, driving further proceedings. The key events are summarized below, along with a photo of the campsite [figure 1]:

- **11 June 1980** – Azaria Chamberlain is born
- **17 August 1980** – The Chamberlains arrive at the Uluru campsite; Azaria disappears that night
- **24 August 1980** – Azaria's jumpsuit, booties, and nappy are found among nearby rocks; her matinee jacket is missing
- **Late August 1980** – Immediate media frenzy begins; Lindy's calm demeanor and Seventh-day Adventist faith spark public suspicion
- **20 February 1981** – First inquest concludes Azaria was taken by a dingo
- **1981** – "Sacrifice" theory emerges, fueled by religious bias and false claims about the meaning of Azaria's name
- **2 February 1982** – Second inquest recommends charging Lindy with murder

- **September 1982** – Trial begins; Lindy is heavily pregnant; media coverage is intense, with daily speculation and criticism of her as a mother
- **13 October 1982** – Lindy is convicted of murder and sentenced to life in prison; Michael is convicted as an accessory
- **17 November 1982** – Lindy gives birth to Kahlia in custody; media coverage further vilifies her; Kahlia is placed in foster care
- **1983–1986** – Appeals to the Federal Court and High Court fail
- **February 1986** – Azaria's missing matinee jacket is discovered near a dingo den, leading to Lindy's immediate release, and an eventual reunion with her three remaining children
- **1987** – A government report criticizes the forensic evidence and finds reasonable doubt regarding Lindy's guilt
- **19 October 1987** – Filming of A Cry in the Dark begins
- **September 1988** – The Northern Territory Court of Criminal Appeal reversres all convictions
- **1988** – A Cry in the Dark is released internationally (entitled Evil Angels in Australia), dramatizing the case and critiquing media sensationalism
- **1991** – Lindy and Michael Chamberlain divorce (both later remarry)
- **1990s–2000s** – "A dingo ate/took my baby" becomes a recurring pop culture reference (Seinfeld, The Simpsons, Frasier)
- **12 June 2012** – Fourth inquest confirms Azaria died as a result of a dingo attack

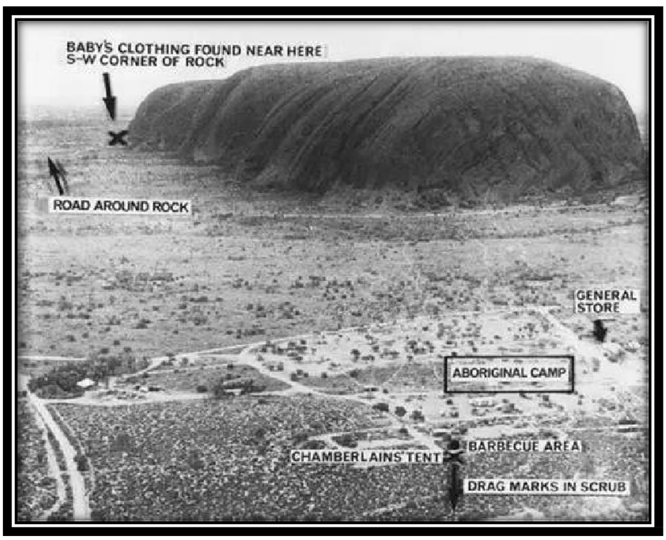

Figure 1: Bird's-eye image of the Uluru camp site. Important reference areas include where the Chamberlains' camp was located relative to surrounding areas. [Image retrieved from Creighton, Rick (n.d.)]

The timeline tells the story of a harrowing journey that began with the belief that a dingo had taken Azaria, descended into years of suspicion and condemnation of her parents, and later revelation of the truth. This roller coaster carried immense emotional devastation, propelled not by facts but by unreliable forensic testimony and the weight of public opinion shaped by the media.

Flawed Forensic Evidence and Conviction

At trial, the prosecution leaned heavily on forensic claims that seemed to implicate the Chamberlains. Forensic experts testified that "fetal blood" was present in their car, pointing to a spray pattern under the dashboard, stains in a camera bag, and even marks on a pair of scissors (EBSCO, 2024). These findings appeared to show Azaria's arterial blood in the vehicle, providing damning evidence to the jury. However, these forensic claims were later proven unsound. Subsequent analyses revealed that the supposed "blood" was not blood at all, but likely a factory-applied sound-deadening compound and other contaminants (Koen, Halkides, and Lott, 2017). Forensic scientists have since shown how early presumptive blood tests were prone to false positives, particularly when applied without confirmatory testing (Koen, Halkides, and Lott, 2017). Substances such as copper oxide dust and spilled milkshake residue were misidentified as human blood (Brown, 2012). Such misinterpretations reveal not only the limits of the science available in the 1980s, but also the dangers of overconfidence in forensic testimony (Linder, 2007).

Meanwhile, valid evidence supporting the Chamberlains was minimized. Aboriginal trackers and fellow campers described hearing Azaria's cry and observing dingo activity in the area, while park rangers testified about recent dingo attacks on children (EBSCO Starters, 2024). Such testimony was overshadowed by the narrative of "blood evidence." Further mishandling of physical exhibits compounded the problem. When Azaria's clothing was discovered by a tourist, police disturbed the site, then photographed the garments after rearranging them. In court, the staged photograph was presented as proof that the clothing must have been deliberately placed, reinforcing the theory of parental guilt (Cunliffe, 2009). Such manipulation of evidence blurred the line between investigation and accusation.

Despite the absence of a body and the lack of any clear motive, the jury convicted Lindy Chamberlain of murder in October 1982, while Michael was convicted as an accessory (Cunliffe, 2009). The outcome demonstrates how flawed forensic interpretations, given excessive weight in court, can override eyewitness testimony, alternative explanations, and even common sense. It also reveals the devastating power of narrative in a courtroom, where a single photograph or claim can carry more influence than consistent accounts from multiple witnesses.

Overturning the Verdict

The case began to unravel when Azaria's missing matinee jacket was discovered near a dingo lair in 1986 (Brown, 2012). This evidence supported Lindy's longstanding testimony and led to her release from prison. A Royal Commission reviewed the forensic evidence and concluded that the supposed blood traces were in fact factory substances, not human blood (Streak, 2020). With this confirmation, the Northern Territory Court of Criminal Appeal overturned the convictions. Decades later, a fourth coronial inquest formally ruled that a dingo was responsible for Azaria's death.

The Chamberlain case stands as a hallmark illustration of how misapplied forensic science can produce wrongful convictions, showing the necessity for testing standards and careful judicial scrutiny of expert testimony (Koen et al., 2017).

Media, Culture, and Perception

The Chamberlain case became culturally iconic, referenced far beyond the courtroom in the media landscape. John Bryson's book Evil Angels (1985) and its 1988 film adaptation A Cry in the Dark, starring Meryl Streep, drew widespread attention (NMA, 2024). Sensationalist media coverage often cast Lindy Chamberlain in a harsh light; commentators noted that the only public images portrayed her as "cold, callous, emotionless, blank" (Lambert-Patel, 2020) as shown in figure 2. Lindy's famous cry when Azaria went missing, "A dingo's got my baby!" (NMA, 2024), was popularly misquoted as "A dingo ate my baby!" furthering the public's hatred. The distorted, comical phrase became an iconic expression of ridicule, common slang for something so ridiculous it cannot be true. The phrase was used in comedies such as Seinfeld and The Simpsons. All served to trivialize the tragedy (Lambert-Patel, 2020). By turning Chamberlain's anguish into a cultural punchline, media helped promote a sensationalism allowing bias to outweigh evidence, thus paving the way for wrongful conviction in any case inviting popular ridicule.

Figure 2: Image of Lindy Chamberlian walking into court with her lawyers. Retrieved from Joanna Whitehead (2020).

Grief and Gender Bias

Reporters often questioned the Chamberlains' judgment, focusing on mundane details rather than evidence. For example, critics asked why they would go camping with a nine-week-old child in August. In reality, the family was staying at a popular campground with community-shared facilities serving a wide array of families, as shown in figure 3 (NMA, 2024). This is not isolated wilderness. Lindy Chamberlain's character came under scrutiny, made two-dimensional: her calm demeanor was portrayed as coldness, and her failure to display the "right" kind of grief was painted as suspicious. Media coverage then amplified the prosecution's claims about blood evidence in the family car, framing it as proof of guilt. Although later analyses showed the supposed blood was nothing more than factory-applied material and other contaminants (Brown, 2012), the image of a bloodstained vehicle persisted in the public imagination. These sensationalized depictions were punctuated by gendered presumptions of motherhood, of how a mother "should" behave. These narratives fueled the belief that Lindy was guilty, even in the absence of credible evidence (Chamberlain-Creighton, n.d.).

Figure 3: Lindy Chamberlain's two young sons posing in front of the family tent at the Uluru campsite. Image retrieved from Bucklow, A. (2020).

Religion and Rumors

Rumors also swirled around the Chamberlains' faith and Azaria's name. One outlet falsely claimed Azaria meant "sacrifice in the wilderness," implying a sinister religious motive (Lambert-Patel, 2020). Though Lindy Chamberlain clarified that Azariah is Hebrew for "God has helped" or "blessed of God," with no occult connotation, the speculation continued (Chamberlain-Creighton, n.d.). Rumor can overshadow fact. Just as the misquote "a dingo ate my baby" became cultural shorthand trivializing the case, the false claim about Azariah's name only reinforced unfounded suspicions. Mere speculation, rather than evidence, came to define the public narrative.

Patterns and Consequences

The Chamberlain saga is a prime illustration of how media storytelling can distort truth and exacerbate injustice. Grieving parents were judged more for their behavior and appearance than by evidence. Lindy Chamberlain was condemned because she "didn't cry enough" or display "enough 'feminine' emotion," presumptions upon which the public as well as the police concluded she was guilty (Lambert-Patel, 2020).

Despite the peculiarity of the case, the pattern of skewed public opinion prompting a miscarriage of justice is not unique to the Chamberlain story. In cases in which grief, gender, or faith do not align with societal expectations, families are subjected to suspicion rather than sympathy. The case demonstrates how easily myths and slogans can override facts, compromising forensic standards and analysis of evidence as essential safeguards against public bias. Chamberlain was not the cold-hearted monster the public wished to see, but a mother who loved her children. Figure four shows the last photos of the beautiful and happy baby Azaria in the hands of her adoring mother.

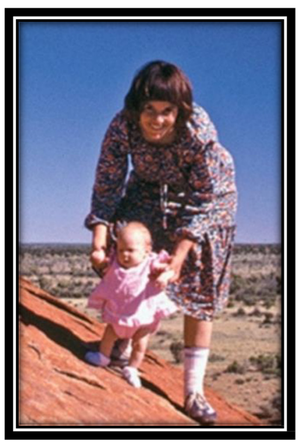

Figure 4: Last image taken of baby Azaria with her mother Lindy taken the day she disappeared. Retrieved from Carnegie, J. (2019).

Lessons for Forensic Science

The Chamberlain case reveals the importance of unbiased, evidence-driven forensic methods. In the early 1980s, presumptive serological tests for substances such as blood and hemoglobin were widely accepted as reliable. At the time, before DNA profiling, these tests were often presented to courts as nearly infallible. Yet their limitations were poorly understood and conveyed to juries. Forensic serology itself was still an emerging field, with institutions such as the Serological Research Institute only recently founded in the late 1970s, leading many scientists to hold misguided confidence in their methods. As colorimetric assays became more widely used, researchers soon discovered that they were prone to false positives and lacked confirmatory follow-up protocols. The Chamberlain case also illustrates the influence of public misperception of forensic science on the justice system. The so-called "CSI effect" denotes how jurors and the public may develop distorted views of forensic evidence due to the consumption of media and television, possessing undue confidence in scientific results even when limitations are explained (Kowalczyk & Smith, 2024). In Chamberlain's trial, such factors amplified the impact of flawed evidence, fueling a narrative overriding objective science.

In 1986, DNA profiling was first used in court to exonerate an innocent man in the Colin Pitchfork case in the United Kingdom (Wolfe, 2016) fundamentally changing forensic science. While DNA profiles are highly informative, they do not inherently convey the biological source or context of a sample. For example, in the case where a victim alleges sexual assault by a male perpetrator, a DNA profile from a male on a victim's bedding does not by itself confirm sexual assault as the DNA could have been left from causal contact. Contextual information, such as identifying the DNA specifically as semen, strengthens interpretation. This demonstrates the continuing importance of body fluid identification in complementing DNA profiling. Modern research explores biomarkers and molecular approaches, such as mRNA profiling and DNA methylation analysis, that can identify body fluids with high specificity (Zubakov et al., 2023; Sijen & Harbison, 2021). When combined with confirmatory testing using human-specific markers and strict quality controls, these methods reduce risks of false positives and encourage more cautious interpretation (Morgan, 2020). Analysts now also consider issues of transfer, rather than assuming that detection equals involvement in a crime (Sijen & Harbison, 2021). The importance of these advancements extends directly to justice outcomes. A review by the U.S. Department of Justice concluded that improved technology and higher standards of forensic practice may have prevented errors in roughly half of wrongful convictions examined (Morgan, 2020). This demonstrates the importance of validated methods, protocols, and maintaining transparent expert testimony.

Other high-profile cases further illustrate the dangers of flawed forensic interpretation and media-driven bias. The O.J. Simpson trial, for example, became a media spectacle where many Americans formed opinions based on televised coverage rather than courtroom evidence. Similarly, dramatizations such as A Cry in the Dark (portraying the Chamberlain case) and Simpson's later book If I Did It fueled speculation long after verdicts were delivered. Both cases also relied heavily on forensic evidence presented as nearly definitive: blood evidence in Chamberlain's trial, and blood spatter analysis in Simpson's, despite their respective limitations. These techniques are now recognized as less reliable and are generally used as supplemental rather than primary forms of evidence. While not directly comparable, the two cases demonstrate how media narratives and overstated forensic claims can profoundly shape public and juror perceptions.

Together, these lessons show that interpretation and bias, both scientific and social, must remain at the forefront of forensic inquiry. As Blackstone famously observed, "it is better that ten guilty persons escape than that one innocent suffer" (LawInfo, 2023). Modern validated molecular assays and confirmatory protocols represent a step forward in honoring this principle, helping ensure the innocent are protected and forensic evidence is applied with accuracy, caution, and fairness.

Conclusion

The Lindy Chamberlain case, immortalized by injustice and public misinterpretation, remains a cautionary tale. It reveals how flawed science and sensationalized media coverage can coalesce to convict innocents, and how vigilant re-examination remains essential. In the years since the case first made headlines, forensic science has made strides: improved validation, better biomarkers, and awareness of bias help prevent a repeat of 1980s errors. The case reminds us that protecting the innocent must take precedence over convicting the guilty. In the words of Michael Chamberlain following the 2012 inquest, "this battle to get to the legal truth… has taken too long," but it shows that "you can get justice, even when you think that all is lost" (NMA, 2024).

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Self/Other/Lover: Construction of Identity in the Life-Writings of F. Scott Fitzgerald and Sheilah Graham

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ABSTRACT

F. Scott Fitzgerald's final unfinished novel, *The Last Tycoon*, was written during his tumultuous twilight Hollywood years, while he engaged in a romantic relationship with the English gossip columnist Sheilah Graham. Just as Graham figures as a character in Fitzgerald's novel, Fitzgerald became the subject of several memoirs Graham composed in the decades after Fitzgerald's death: *Beloved Infidel, The Rest of the Story*, and *The Real F. Scott Fitzgerald*. Using the work of the autobiographical theorist Paul John Eakin, this article analyzes the ways in which Fitzgerald's thinly-veiled fiction and Graham's dubious memoirs work in tandem to construct autobiographical selves. Incorporating a range of biographies and letters, in addition to the "fictions" and "memoirs" of these two intimately interlinked writers, this essay challenges the easy binaries between supposed narrative forms, and seeks to uncover new angles into these two authors, their work, and their literary legacies.

In 1937, after a decade of personal disaster, F. Scott Fitzgerald made his third attempt at becoming a successful screenwriter in Los Angeles. His wife, Zelda, had been institutionalized for schizophrenia, and his daughter, Scottie, was attending expensive finishing schools, which Fitzgerald was adamant that she would see all the way through. Fitzgerald himself struggled to remain sober; his novel *Tender is the Night*, eight long, hard years in the making, had been a commercial flop. This desperate venture to Hollywood was Fitzgerald's final valiant attempt to stage a personal and professional comeback—to rescue his financial affairs as well as his own dignity.

Meanwhile, not long before Fitzgerald's arrival in California, a mysterious Englishwoman had herself floated into Hollywood as a burgeoning journalist. Sheilah Graham had come far from the slums of London. After an aborted turn as an stage actress, she had made an appearance at the Royal Court as the fiancee of a Major John Gillam. She then become an entertainment journalist in New York before landing finally in Hollywood, where one fateful night she locked eyes with F. Scott Fitzgerald across the room of a party given to celebrate her engagement to another wealthy, titled man named Lord Donegall. From the night of that party — July 14, 1937, to December 21, 1940, when Fitzgerald succumbed to a fatal heart attack in her apartment—he and Graham become lovers and fighters, a teacher and a student, but ultimately close friends and confidants. In this last year of his life, Fitzgerald poured the remnants of his serious literary energy into his final, unfinished novel, The Last Tycoon, which he envisioned as the as-yet unwritten, definitive novel about Hollywood. Fitzgerald, as always, drew significantly from his own life. While the hero of *The Last Tycoon*, Monroe Stahr, was modeled initially after the movie producer Irving Thalberg, but in the course of the novel, the character ultimately becomes Fitzgerald himself. The novel s emotional core is a romance between Monroe Stahr and Kathleen Moore, who is clearly modeled after Sheilah Graham. Years later, Graham wrote her own account of her romance with Fitzgerald in her 1958 memoir, *Beloved Infidel*. In both of these texts, Fitzgerald and Graham practice the art of life-writing. The shared method was apt: while all of Fitzgerald s significant fiction had contained nakedly autobiographical elements, all of Graham's memoirs had contained deliberate fictionalizations. In these works, the authors compose—and construct—both the self and the other. Viewing them together provides a rich exemplification of self-construction and mutual portrayal, of intertwined lives and literary legacies.

For both writers and both texts, there are challenges and complexities that, at first blush, may threaten to obscure their reliability. As Fitzgerald did not live to complete *The Last Tycoon*, the novel was initially edited and completed by Fitzgerald's close friend and literary conscience," Edmund Wilson. Later, a more definitive version of the novel was published by Fitzgerald scholar Matthew Bruccoli. *Beloved Infidel*, on the other hand, was written with the collaborator Gerold Frank. In both works, self-construction and mutual portrayal is complicated: by incompletion and posthumous editorship on Fitzgerald s end, and by the ghostwritten ediation and white lies on Graham s end. This naturally raises questions of authorship and authenticity, seemingly obscuring the identity construction of self and other.

The noted scholar of autobiographical studies, Paul John Eakin, has devoted several books to theorizing the construction of identity among life-writers. In *Fictions in Autobiography*, Eakin posits the notion that what he calls the autobiographical act" is inherently diluted by fictional elements: "Autobiographical truth is not a fixed but an evolving content in an intricate process of self-discovery and self-creation," Eakin writes, adding, "the self that is the center of all autobiographical narrative is necessarily a fictive structure" (3). If autobiography is, by nature, partially and necessarily fictive, and if Fitzgerald s major fictions are undeniably autobiographical, then the application of Eakin's framework to Fitzgerald s fiction provides opportunities to yield fresh observations about Fitzgerald's—and Graham's—life and work. It might also open vistas into other autobiographical life-writers, especially as reflective of the era in which the novel was the dominant literary form. In accepting the presence of *fiction in autobiography* as inherent to the form, it becomes possible to view Fitzgerald's *autobiographical fiction* through a similar lens, asking similar questions: How is the self constructed? What does this say about the art of life-writing? And, for both Fitzgerald and Graham, how are constructed selves mediated and complicated by outside authorship?

Both Fitzgerald and Graham engage in relational acts of self-construction: each composes the self via the other, blurring boundaries between fiction and memoir. Their texts bear out Eakin's claim that identity is always co-authored, or shaped by others. These relationships and inadvertent collaborations, constructions and mediations, can be subject to an analysis that moves to subvert the often arbitrary binaries that exist between narrative forms.

Roland Barthes said, "'The one who speaks (in the narrative) is not the one *who writes* (in real life) and the one *who writes* is not the one *who is*,'" Paul John Eakin reminds us. "Barthes [wisely senses the] need to discriminate among the plurality of identities concealed in the 'person' of the first-person singular" (Fictions 25). There is no singular, constant self—seemingly offering confirmation of Whitman's famous statement about containing "multitudes." (Biology has even further revealed that the cellular "self" is more less entirely reproduced every seven to ten years.) For Eakin, and for the other life-writers he analyzes, the process of autobiographical composition is an *intentional reconfiguring* of the self from its many disparate parts. That, of course, is the compelling art of the form—the "I, now," attempting to make sense of the "I, then," as memoirists often insist. But perhaps that this intentional construction of identity is as inherent in "strict" autobiography as it is in certain well-known life-writing novelists. (It is certainly true of Scribners' lineup of titan 20th century novelists writing contemporaneously under the editorship of Maxwell Perkins: Fitzgerald, Hemingway, Wolfe.) According to Eakin, identity is produced *through* the very process of writing. Identity in narrative—whether autobiography, memoir, autofiction, letter writing, or the semi-autobiographical novel, is always a construction. While the term "autofiction" was not used in Fitzgerald's day, and while it refers to an intentional merging of a "real life" author with their "fictional" characters, Fitzgerald's work, it can be argued, is an anticipatory demonstration of what life writers do: fracture, construct, and mythologize the self.

We readily accept the presence of autobiographical elements in fiction," Eakin writes. "Thoreau wisely reminds us of the inevitable presence of autobiography in fiction when he observes that it is, after all, always the first person that is speaking'" (*Fictions* 9). Thoreau, in the mid-nineteenth century, is unwittingly echoing the "observer effect" that has become, in recent decades, a given fact in the scientific community: there is no removing the "I" when the "I" is observing a phenomenon. Moreover, as Eakin writes elsewhere, The latest developments in brain science today confirm the extent to which memory, the would-be anchor of selves and lives, constructs the materials from the past that an earlier, more innocent view would have us believe it merely stored" (*How Our Lives Become Stories* 106). This unreliability of memory confirms that any conception of the past is not set in stone, but is, rather, an "evolving content." Life-writing, regardless of form, is always a kind of performance, never a pure process of truth-telling.

If we accept that elements of fiction are inherent to the form of autobiography, it is no great leap to accept that a writer like Fitzgerald, whose fictions are widely acknowledged as extremely autobiographical, is as occupied with composing the self as much as any life-writer. In 1935 Fitzgerald revealed to his secretary, quite tellingly, My characters are all Scott Fitzgerald. Even the feminine characters are feminine Scott Fitzgerald's"; Asked if he used any other models, he said, Not any single person but a melange of the characteristics of several together, interpreted through my eyes" (Hearne). Such self-splicing is a hallmark of life-writing. Both Fitzgerald and Graham, whether working in fiction or memoir, enact the autobiographical process as Eakin describes it.

While Fitzgerald did not live to complete *The Last Tycoon*, the reality of its posthumous editorship doesn't strip away Fitzgerald's authorship or detract from the authenticity of the self-construction therein. All selves are relational, an idea that is itself expressed in the novel: "Writers aren't people exactly," says Cecelia, the narrator, "Or, if they're any good, they're a whole lot of people trying so hard to be one person" (12). One of the central ideas of Paul John Eakin's autobiography theory is the "relational self." Any self, whether constructed in a text or in simply one's own mind, is a composite, constituted from the web of relations that define a human life. The relational self is that which is understood as in connection with family, friends, lovers, colleagues—even audiences, which is important for authors who *write themselves into existence*, constructing their identities for posterity—or for each other, as in the case of Fitzgerald and Graham. Both Fitzgerald and Graham constructed public personae in addition to their written selves; Both had to make sense of their disparate elements and somehow cohere them.

"The process of self-discovery is finally inseparable from the art of self-invention," Eakin writes (*Fictions* 55). Fitzgerald, although he famously said there are no second acts in American lives" (qtd. in Meyers 325), did reinvent himself, several times: his glittering early success gave way to a midlife crack-up, from the depths of which he reinvented himself in Hollywood. As early as 1924 he had written Max Perkins, on the eve of embarking on the composition of *The Great Gatsby*: "I'm tired of being the author of *This Side of Paradise* and I want to start over" (Letters 188). His old wish to discard a previous self and establish a fresh identity also resurrected itself when his name no longer commanded the huge sums they once did in popular magazines. "I'm awfully tired of being Scott Fitzgerald anyhow, as there doesn't seem to be much money in it" he wrote his editor at Esquire in 1940 (*Letters* 624). This fractured self shows up in *The Last Tycoon* as well, although Fitzgerald puts the words into Kathleen's mouth, speaking to Stahr (himself): "Don't you always think—hope that you'll be one person and then find you're still two?" (89). Yet a coherent, stable self is not something that is even possible to achieve in life-writing. In both of their personal lives, not to mention their literary texts, Fitzgerald and Graham were individuals divided. Fitzgerald was caught between the competing demands of his art, of surviving in Hollywood and supporting his family. But if anyone knew how to construct a self, and then sell it convincingly to the world, it was Sheilah Graham. She, too, seemed eager to reinvent her image every time she put pen to paper in her tell-all memoirs.

Beloved Infidel was published eighteen years after Scott's death. If any text demonstrates the porous boundaries between fiction and memoir, it is this one, and not necessarily less so than any of her subsequent books. Years later, Sheilah wrote, *Beloved Infidel* was a romanticized version of my love for Scott, not fully exploring our story s complexity. It gave *the facts as I viewed them* in 1958, looking through the discreet haze of the times and the gloss of my experienced collaborator" (13) [emphasis mine]. This "discreet haze" could be the fold of years that stretched between 1937 and 1958, highlighting again the unreliability of memory. Or perhaps the "haze" Graham refers to is her own autobiographical ambivalence; her recollection of events is often unreliable, even self-serving. But once again, given the innate relationality of life-writing, we would do well to consider the influence that Graham's collaborator, Gerold Frank, brought to bear on the composition of *Beloved Infidel*, what Graham called her ghostwriter's "gloss." This "gloss" and this "haze" obscure the self-construction that Sheilah strove for in *Beloved Infidel*. But two decades after the publication of that first memoir, she tried again to explicate a life-writing philosophy: I shall do my best to present an objective picture of what Scott Fitzgerald was really like, seeing him partly through his own eyes and also judging him from my present vantage point. I think I can do this because I am no longer the young woman mesmerized by his love for me and mine for him" (*Real* 16). This moment encapsulates the time element of memory, and memoir itself: the memoirist, or the autofictionalist—whatever genre the life-writer is working in—can only do their best to adhere to *the telling of the truth as they see it*. "Any [life-writer], acting in the best of faith, is going to produce a narrative that will have fiction in it, like it or not," Eakin insists (*Fictions* 10). Life-writing allows us to see how people present themselves—and what that presentation has to say about them.

Fitzgerald told a young journalist much the same thing about his process while discussing his craft. Although most of what I've told you is fact, I did take liberties," he said. "The sort I take when I turn a personal experience into fiction. I was telling you what I may some day get a chapter out of. Or a story. I didn't intend to deceive you. There's a *kinship between fiction and reality as a situation takes shape* in the writing" (Buttitta 80) [emphasis mine]. This "kinship" between fiction and nonfiction is the nebulous space that offers the possibility to see how life-writing theory can open new windows into Fitzgerald's process. Just as Fitzgerald's writer's mind worked its "double vision," as Malcolm Cowley called it, so this fractured self shows up repeatedly in his fiction. Life and art were inextricably bound up, as Fitzgerald acknowledged: Sometimes," he said, "I don't know whether I'm real or whether I'm a character in one of my own novels" (qtd. in Cowley

65-66). In *The Last Tycoon*, Fitzgerald builds in two moments where he admits the multiplicity of his own self. In neither instance is Monroe Stahr the speaker—offering further proof that all of Fitzgerald's characters are in some way reflected and refracted versions of his own identity: "Are you surprised?" [Kathleen asks Stahr]. "At what?" Stahr responds. "That we're two people again," says Kathleen, "Don't you always think—hope that you'l be one person and then find you're still two?" (88). In another scene, the novel's occasional narrator, Cecelia, seems to speak for Fitzgerald: Writers aren't people exactly," Cecelia says. "Or if there any good, they're a whole *lot* of people trying hard to be one person" (12). Perhaps no moment in Fitzgerald's fiction is as apropos to Eakin's notion that fixed selves are illusory.

"When we settle into the theater of autobiography," Eakin writes, "what we are ready to believe—and what most autobiographers encourage us to expect—is that the play we witness is a historical one, a largely faithful and unmediated reconstruction of events that took place long ago." But it isn't that simple. "In reality, the play is that of the autobiographical act itself, in which the materials of the past are shaped by memory and imagination to serve the needs of present consciousness" (Fictions 56). The life-writer looks back upon the history of the life, the self, what Fitzgerald called "that terrible door into the past through which we all must go" (*Crack-Up* 173). Making sense of self is the modus operandi of memoir. For F. Scott Fitzgerald, nearly all of his writings were autobiographical attempts to make sense of the self he was, the self he had been, and the self he wanted to be.

Jeffrey Meyers writes of Scott and Sheilah that their attachment developed "because they were both eager to put the past behind them, to establish a new identity in the alien and rather ruthless society of Hollywood" (343). Both were, in a sense, refugees. Sheilah had "invented a glamorous past and a new identity to disguise her humble origins. When Fitzgerald met her, she had established herself as an upper-class Englishwoman and consistently maintained this role in her professional life. During her three and a half years with Fitzgerald, and for many years afterward, she kept up this *carefully constructed public persona*" (Meyers 343) [emphasis mine]. Sheilah is not the only one who concealed parts of herself and emphasized others, for Scott was careful to do the same. Life-writing is about image creation. But, identity and narrative in life-writing are selfsame: Self and story are complementary, mutually constituting aspects of a single process of identity formation," Eakin writes (*Fictions* 100). Identity is constructed *through* narrative—the stories we tell ourselves *become* our reality.

The Fitzgerald that Graham constructs in her memoirs is not a full portrait, even though she published multiple versions of the same stories across the span of several decades. Deliberate omission, it seems, came as naturally to her portrayal of Fitzgerald as they were to her own autobiography. One of Sheilah's adamant statements—that is, one consistent across her memoirs—is that Fitzgerald remained entirely sober during the last year of his life as he worked on *The Last Tycoon* in between various short-lived script assignments. But the truth is that Fitzgerald did drink, only apparently in Sheilah's absence. Fitzgerald's secretary informed Sheilah about his secret drinking in the late 1950s, while she was writing *Beloved Infidel*. Nonetheless, "Sheilah and her collaborator Gerold Frank deliberately omitted this information from her autobiography since it contradicted the clean dramatic tale they wished to spin—that Scott Fitzgerald never touched another drop of alcohol after their big fight in November 1939" (Westbrook 488). Considering Sheilah's gift for first creating a reality, and then launching herself into it without a backward glance, it is fair to wonder if she had somehow actually convinced herself of this untruth over time. This was the Scott she had deliberately constructed. Perhaps it was as real to her as the other fabrications—stories, selves—that she clung to for the rest of her life.

These texts reveal how autobiography and autobiographical fiction are interdependent modes of self-fashioning. Both writers enact Eakin s autobiographical act" as a performance—one shaped by mediation and construction in various narrative forms. Although we are accustomed to thinking about identity as individually owned, it is rather a social, relational construction. The intertwined legacies of life-writers like Fitzgerald and Graham dramatize how to write the self is always to write the other—a mysterious, complicated truth at the heart of modern life-writing.

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The Effects of Smartphone Screen Time on Behavioral Variability

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ABSTRACT

Individuals diagnosed with conditions such as attention-deficit/hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and depressive disorders tend to display variable behavior, disparate from their peers. Studies have shown that variable behavior can be either enhanced or reduced through reinforcement. However, these factors are poorly understood. Screen time has been hypothesized as a factor that may influence behavioral variability. The following study explores the possible relationship between smartphone screen time, behavioral variability, and self-reported ADHD, ASD, and depressive symptoms, using a threefold methodology: first, participants reported their screen time use through a smartphone application. Next, participants completed a computer-based task assessing behavioral variability, during which they drew rectangles on a screen. Points were awarded for rectangles that differed from those previously made. Finally, participants completed the Beck Depression Inventory (BDI-II), Autism Spectrum Quotient-10 (AQ-10), and Adult ADHD Self-Report Scale (ASRS-v1.1). We found weak correlations between scores on the AQ-10 and the ASRS-v1.1, as well as between the ASRS-v1.1 and the BDI-II. At the same time, there were moderate correlations between different measures of behavioral variability, and a correlation between objective and subjective screen time scores, revealing consistency in these assessments. Results nevertheless indicated no systematic relation between screen time and behavioral variability.

Variability in behavior is adaptive for numerous reasons. Reaction to unique and differing situations adaptively can facilitate both survival and learning. The degree to which an organism exhibits variability has significant implications for its physical and psychological well-being. Numerous factors contribute to enhanced or reduced behavioral variability in humans. Social, cultural, biological, and psychological factors all contribute to shaping behavioral variability. While many factors may play a vital role, research on what can affect behavioral variability remains ongoing. Of recent concern has been the psychological and behavioral influence of screen-based technologies. Since introducing these technologies, researchers have sought to understand the potential consequences of their use. This study investigates the possible relationship between screen time and behavioral variability.

Behavioral Variability

Adapting and changing in response to specific external influences is evolutionarily beneficial, as it increases an organism's chances of surviving and thriving in its environment (Darwin, 1859). For example, animals that forage for food in various locations are more likely to find it than those that repeatedly look in the same location (Wright et al., 2010). In addition, as organisms learn, behavioral flexibility can serve as a protective factor in overcoming crises and fostering resilience (Orkibi, 2021). Historically, behavioral variability has been crucial to versatility and human development (Temple & Stojanowski, 2019). This ability to adapt and to be flexible allows for a nearly limitless number of responses to circumstances (Hadders-Algra, 2010). Although there are certain situations where variability is not preferred (e.g., disrobing when it is not appropriate), variability is generally considered a beneficial or adaptive quality of behavior. Thus, variability in behavior can be regarded as fundamental in learning new skills, problem-solving, and encouraging creativity (Neuringer, 2004).

Previous research has demonstrated that reinforcement can maintain variability (for a review, see Neuringer, 2002) and that the advantages of behavioral variability in acquiring new skills and promoting creativity are clear (e.g., Hansson & Neuringer, 2018; Weiss & Neuringer, 2012). Neurodivergent individuals (i.e., those whose neurology and behavior fall outside the bounds of typical societal norms) may sometimes struggle to behave variably, even when it would be beneficial to do so (American Psychiatric Association, 2022; Shah et al., 2022). Determining the relationship between behavioral variability and an individual's mental or neurodevelopmental disorder could be beneficial because it would enable practitioners to gain a deeper understanding of the disorder.

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that involves stereotyped movement and inflexible behavior, among other symptoms (American Psychiatric Association, 2022). This behavioral inflexibility can lead to social isolation and reduced learning opportunities (Rodriguez & Thompson, 2015). Progress has shown that intervention can increase and reinforce behavioral variability (Miller & Neuringer, 2000; Rodriguez & Thompson, 2015; Wolfe et al., 2014). In contrast to some of the more restricted and stereotyped behavior seen in many individuals with ASD, people diagnosed with attention-deficit/hyperactivity disorder (ADHD) are prone to display excessively variable behavior (American Psychiatric Association, 2022; Hunziker et al., 1996; Mook et al., 1993). These behaviors often occur when it is not socially acceptable, such as in the classroom during work tasks or parent-child interactions (American Psychiatric Association, 2022; DuPaul et al., 2001; Neuringer, 2009). Whereas reinforcement has been used to increase behavioral variability in individuals diagnosed with ASD, reinforcement could be used to moderate behavioral variability in those diagnosed with ADHD. Another psychological disorder related to low behavioral variability is major depressive disorder. Although the literature regarding behavioral variability and depressive disorders is not extensive, preliminary research suggests that depressed individuals show lower levels of behavioral variability than their neurotypical peers (Hopkinson & Neuringer, 2003).

Screen Time

The duration of time spent staring at electronic screens, or screen time, has been a concern among parents and educators since the pre-internet television era. The type of technology used in the study of screen use varies depending on the year, but it may include televisions, phones, computers, tablets, and more (Jari et al., 2014; Jones et al., 2021; Keikha et al., 2020; Martin et al., 2021; Olson et al., 2022). For the present study, screen time is defined as watching or engaging in content on a handheld or non-handheld device such as a personal computer (PC), cell phone, television (TV), or tablet.

Autism spectrum disorder (ASD), which is characterized by restricted interests and deficits in social skills, has frequently been associated with increased screen time (American Psychiatric Association, 2022; Slobodin et al., 2019). A number of studies have suggested that higher use of screen time may lead to an increased risk of social anxiety, which has significant implications for those with ASD (Westby, 2018). Although hypotheses on these findings draw different conclusions, inferences remain inconclusive, and causality between the different factors has not been definitively determined. Additionally, although the literature on the effects of screen time on individuals with ADHD is limited, some preliminary studies have investigated this relationship (Cavalli et al., 2021; Soares et al., 2022; Vaidyanathan et al., 2021). Still, a relationship between screen time and ADHD has not been conclusive. Further, little literature addresses the potential effects of screen time on depression. Some evidence points to the idea that youth exposed to more screen time get less sleep, resulting in a higher risk of developing depressive symptoms than their peers (Liu et al., 2019; Wang et al., 2021).

It has been proposed that screen time may be a factor influencing behavioral variability, or vice versa. Two seminal hypotheses exist to explain the potential relationship between screen time and behavioral variability. The stimulation hypothesis suggests that behavioral variability can be stimulated by viewing certain behaviors on electronic devices. The reduction hypothesis posits that screen time disrupts thought processes and can ultimately lead to a decrease in creativity (Calvert & Valkenburg, 2013). Both hypotheses can point to research that may substantiate the claims, yet the literature is mixed and correlational.

Purpose of the Current Study

The primary purpose of the present study was to further our understanding of the possible relationship between smartphone screen time and behavioral variability. We collected data from college students to assess any potential correlation. If participants who engaged in more screen time also behaved more variably, then screen time and behavioral variability would be positively correlated; if participants with more screen time use behaved less variably, the results would show a negative correlation. Either result could provide evidence supporting or refuting the hypothesis that screen time displaces creative, or variable, behavior, or vice versa. If no systematic relationship between behavioral variability and screen time was observed, we would gain more insight, yet further research would be required to draw this conclusion definitively.

Past studies on screen time have primarily relied on self-reports instead of objective measures to track the screen time of their participants. Continual technological advances have led to the development of more impartial methods. We monitored participants utilizing the default screen time tracking feature included with iOS and Android smartphones. However, we also asked participants to self-report estimates of their total screen time on other devices.

Various methods have been employed to assess behavioral variability and creativity, including play activities such as coloring (Bancroft et al., 2016) and block building (Goetz & Baer, 1973). The current experiment used an established computer-based rectangle game to measure participant variability (Galizio et al., 2020; Ross & Neuringer, 2002). In this task, participants created rectangles of varying sizes and locations. We assessed variability as it occurred under different schedules of reinforcement (i.e., points), to consider also the possibly relationship between screen time and reinforcement.

As both behavioral variability and screen time have been linked with specific psychopathologies, a secondary purpose of the study was to investigate individual differences in behavioral variability and screen time, especially related to symptoms of certain psychopathologies, including ASD, ADHD, and depression. To do so, we administered health screeners to detect ASD, ADHD, and depressive symptoms. Any of these relationships would contribute to the current literature on screen time and behavioral variability.

Method

Participants and Setting

Participants in the study were college students enrolled in introductory psychology courses and recruited through the psychology department’s research pool via Sona Systems®. All students were at least 18 years old. Only students with a smartphone that had the default screen time tracking application were eligible to participate. Participants gave informed consent before completing any surveys or tasks. After completing the tasks, participants completed a demographics survey through Qualtrics® to assess participant characteristics. To minimize possible emotional or psychological distress, participants were debriefed immediately following their session. Experimental procedures were conducted in line with the guidelines provided by the American Psychological Association and approved by the Institutional Review Board (IRB) of (blinded) (Protocol Number: FY2023-36). Each participant was assigned a participant identification number to maintain confidentiality.

A total of 63 participants began the study. One participant did not complete the experiment because their screen time tracking app was not activated before the study began. Additionally, four participants experienced technical difficulties during the behavioral variability task, which resulted in their data not being saved correctly; these participants were also excluded from the data analysis. Following these exceptions, a total of 58 participants completed the entire study with usable data. After five outliers without usable data were identified and excluded, 53 participants remained.

Participants completed the study in a small on-campus computer lab with minimal distractions. Each participant used one computers in the room; when multiple participants were tested in the same room, the start time was staggered. Each individual was seated at least two seats away from other participants. After arrival, participants were instructed to complete several computer-based tasks: (1) a survey in which they reported their screen time, (2) a behavioral variability task, and (3) several different psychopathology screeners. After completing all of the tasks, participants responded to a demographics survey (see Table 1) and were then debriefed by the researcher. After completing the study, participants received course credit and were reminded to contact the researchers if they had questions or concerns.

Table 1

Demographics

Sociodemographic Characteristics	*n*	%
Total	53	
Women	30	57%
Men	18	34%
Nonbinary	3	4%
Genderfluid	2	6%
Age		
18-24 years old	51	96%
25-34 years old	2	4%
Ethnicity		
Caucasian or White	29	55%
African American	11	21%
Asian	3	6%
Latino or Hispanic	6	11%
Mixed	4	8%
Education Level		
High school	40	75%
Associate's Degree	1	2%
Some Bachelor's	12	23%
Master's Degree	0	0%
Parental Education		
High School	14	26%
Associate's	3	6%
Bachelor's	17	32%
Master's	10	19%
Ed.D., PsyD., Ph.D.	5	9%
Some Bachelor's	3	6%
Prefer not to say	1	2%
Psychological Condition	15	28%
English	52	98%
Other	0	0%
Prefer Not to Say	1	2%

Materials and Design

Screen Time Assessment

In the first task, participants completed a Qualtrics® survey in which they reported their screen time use. The survey began with questions related to general screen time use. Participants were first asked to estimate their average daily screen time use in hours across all devices over the last week. They were also asked to indicate all the devices they owned that had screen time capabilities.

On the next page, participants were asked to find their researcher for assistance. The researcher described the ScreenTime programs used to track their smartphone use and provided a general description of the program for either Android® users or iPhone® (iOS) users. The programs were the ScreenTime system for iOS users and the Digital Wellbeing® system for AndroidOS users. These applications are included in the default operating systems of the iPhone and Android phones and track the time a person spends on their phone. Both systems operate by measuring the time an individual interacts with their device after it is opened. The researcher instructed each participant to locate records of their screen time use on their phone. If needed, the researcher assisted the participant in locating the records. Participants entered their daily average smartphone screen time use over the past week, and the researcher verified that the information was entered correctly. The researcher only observed the total amount of screen time used, not the particular applications and websites visited by the individuals.

Behavioral Variability Task

Next, participants were given a computer-based task assessing behavioral variability. This task required participants to use the mouse to click and drag on the screen to form rectangles. The participant was seated in front of a computer as the researcher loaded the program displaying the instructions. The researcher then read the instructions aloud to the participant and asked whether the participant had any questions. Instructions informed participants that they were about to play a game that involved creating rectangles. They were then informed that some rectangles would produce points; that participants would hear a tone when they earned a point; that the total number of points would be shown on the screen; and that the game's purpose was to earn as many points as possible. The participant was then given a pair of headphones to listen to the tones and instructed to press the "Start" button when ready.

The task details were similar to those of Galizio et al. (2020). Participants performed the task on a large white area in the center of the computer screen. The white space did not include grid lines or any other spatial parameters to guide participants in the areas in which they draw rectangles. Participants used the lab computer's mouse to create the rectangles by pressing the mouse's left button and drawing the desired rectangle. When the mouse's left button was pressed and dragged, the shape of the rectangle appeared. Upon release of the button, the rectangle disappeared. A point delivery and tone followed some rectangles, while some rectangles had no programmed consequence. Between each trial of the task, there was a 1-s interval in which the computer screen turned blank, and participants could not use the mouse.

The categorization of rectangles was based on both size and location for the task. Specifically, the dimensions scrutinized for the task were the size (area) of the rectangles and their specific location on the screen (represented by the center of the rectangles). For each of these dimensions, 16 different categories were created. For example, with the size dimension, a model random generator could make several rectangles that fit within the confines of the screen. Then, the 16 different categories were defined so that each rectangle, from smallest to largest, had an equal occurrence in each category (see Galizio et al., 2020, and Ross & Neuringer, 2002, for details).

During the task, points were awarded for some rectangles based on a relative frequency threshold contingency, which requires behavioral variability. The relative frequency of each dimension was calculated on each trial. Each time a participant drew a rectangle, the relative frequency for each category was determined. Then, these relative frequencies were compared to a fixed threshold value. The fixed threshold value was selected based on Galizio et al.'s (2020) procedure. The threshold value of 0.2 signified that for a point to be delivered, the rectangle drawn had to be in a category of the target dimension (either size or location) in which 20% or less of the rectangles had already occurred. This value was selected because it is relatively lenient, allowing for the observation of more significant individual differences in levels of behavioral variability.

Participants completed two conditions, or versions, of the same game. They completed 300 rectangles in each condition. In the first condition, one of the dimensions, size or location, was set as the target dimension. The first target dimension was counterbalanced across participants. The other dimension was established as the target dimension in the second condition. For example, if a participant's target dimensions were size in the first condition and location in the second, then that participant had to make rectangles that varied in terms of size to earn points for the first 300 rectangles and rectangles that varied in terms of location to earn points for the second 300 rectangles. In each condition, levels of variability were measured for both dimensions. If participants responded according to the contingencies, we would expect to see high levels of variability on the target dimension but not on the other dimension during each phase.

Psychopathology Screeners

Next, participants completed three psychopathology screeners in a random order. All surveys were administered through Qualtrics® on a computer in the lab. These screeners are described below.

The Autism Spectrum Quotient-10 (AQ-10) was administered to assess for possible symptoms of ASD. The AQ-10 is a well-validated screener (internal consistency for adults was 0.85 and .89 for adolescents) that provides a quick measure of where an individual may be on the autism spectrum (Allison et al., 2012; Baron-Cohen et al., 2001). The screener contains ten brief statements. Each question of the AQ-10 focuses on behaviors that many individuals with ASD exhibit. The participants were given statements describing autistic behaviors and asked to rate their agreement with how much they exhibit the behaviors. The level of agreement is assessed using a four-point Likert scale, progressing from "Definitely Agree" to "Definitely Disagree," with "Slightly Agree" and "Slightly Disagree" used to indicate moderate agreement or disagreement (Allison et al., 2012). It should be noted that although this questionnaire is designed to indicate whether an individual shows some of the symptoms of ASD, the AQ-10 is not an official diagnostic tool.

The Beck Depression Inventory-II (BDI-II) is a highly validated (internal consistency of 0.93) and proven measure containing 21 items used as a self-report assessment to measure attitudes and symptoms of depression (Beck et al., 1961; Contreras et al., 2004). The inventory covers depressive symptoms such as pessimism, past failure, anhedonia (loss of pleasure), and guilty feelings. It asked participants which statement regarding the symptoms they feel describes their current state. Despite its widespread use as a screener, the BDI-II is not the single determinant of an individual's potential depressive state. Instead, it is utilized in concert with other measures to make a diagnosis (Subica et al., 2014).

The Adult ADHD Self-Report Scale (ASRS-v1.1) is a screening tool developed to help determine if a person exhibits symptoms consistent with the ADHD criteria outlined in the DSM-5 TR (Kessler et al., 2005). It was designed for adult use and was tested on a sample of adults aged 18-44. The ASRS-v1.1 consists of six brief statements that require the individual to indicate their level of agreement on a five-point Likert scale, ranging from "Never" to "Very Often" (Kessler et al., 2005). These statements self-report in a range from complete disagreement with the statement to complete agreement. The scale also contains descriptors between the two polar ends that indicate moderate agreement. As a self-report tool, the ASRS-v1.1 is used to indicate whether an individual exhibits symptoms consistent with a diagnosis of ADHD and is not intended for use as an official diagnostic tool. In addition, the National Institute for Health Research (NHS), which created the screener in tandem with researchers from Harvard Medical School, has tested the validity of the

ASRS-v1.1 and has demonstrated that it is a well-validated screener (internal consistency for the total scores was 0.84, and the subset symptom scores were 0.83; Subica et al., 2014). Another group of psychiatrists has also demonstrated similar levels of internal validity (Adler et al., 2006).

Demographics Survey

Finally, participants were asked to report personal demographic information in a Qualtrics® survey. Questions included: gender identity, age, race/ethnicity, level of education, parental education, and primary language. In addition, participants were asked whether they had ever received a diagnosis of a mental disorder, psychological condition, or educational disability of any kind. Finally, participants were asked to describe what they thought the study was about and how they believed they earned points in the variability task.

Data Analysis

The dependent measures for the screen time assessment included objective and subjective measures. The objective measure was the average number of hours of screen time per day recorded on the participant's smartphone over the last week. The researcher verified this value, which should objectively represent the participant's smartphone use. The subjective measure was the participant's self-reported estimate of their daily screen time, in hours, across all devices. This self-reported value was analyzed separately because it is a more subjective measure than the verified number of smartphone hours.

The dependent measures for the behavioral variability task included the number of points earned and the U-value. The number of points earned is the total number of points delivered across both task conditions. More points would indicate more variable behavior according to the target dimension. U-value is another measure for the behavioral variability task, commonly utilized to evaluate an overall level of variability with a range of 0 to 1 (Page & Neuringer, 1985). A U-value of 0 demonstrates complete repetition (for this study, it would be that all rectangles made fell into the same category in the dimension), and a U-value of 1 indicates completely stochastic, variable/ random responses (i.e., rectangles made in every possible category equally). U-value is determined using Equation 1:

$$(1) \qquad U = -\sum_{i=1}^{n} \frac{Rf_i * log_2(Rf_i)}{log_2(n)}$$

In this equation, Rf_i refers to the relative frequency at which a response is emitted, and n is the number of response categories (in this study, we used 16). U-values were compared across conditions and dimensions using a 2 x 2 repeated-measures two-way analysis of variance (ANOVA), with Šídák's multiple comparison tests to examine interaction effects. This analysis was conducted using GraphPad Prism.

The dependent measures for the psychological screeners were the scores on each survey. For example, the Autism Spectrum Quotient 10 (AQ-10) has scores that enable a participant to be quickly screened for certain behavioral traits common among individuals with autism. For the screener, one point could be earned for each question, and a score of six or higher (with a maximum score of ten) may indicate the possible presence of adult autism (Allison et al., 2012). Next, the Beck Depression Inventory-II has scores that range from zero to 63. The scores on the inventory are divided into different groups. From zero to 13, a person is considered to be reporting minimal depressive symptoms; from 14 to 19, it is considered mild; from 20 to 28, it is regarded as moderate; and from 29 to 63, it is deemed severe self-reported depression (Beck et al., 1961). Finally, the Adult ADHD Self-Report Scale (ASRS-v1.1) has a different scoring procedure than the other self-report screeners. In the ASRS-v1.1, the screener consists of non-numerical values affixed to the items that range from "Never" to "Very Often." If the study participant checked

"Sometimes," "Often," or "Very Often," these items were counted as a point toward their overall adult ADHD score. Three or fewer points indicate that the symptoms may not be consistent with adult ADHD, while four or more points suggest that the person may have symptoms consistent with adult ADHD (Kessler et al., 2005).

Given that this study is a preliminary investigation of the potential relation between behavioral variability, screen time, and various psychological symptoms, the primary analytic technique used was correlation. To determine which correlation analytic technique would be the most appropriate, the data for all variables were assessed for normality using the Shapiro-Wilk test. The Shapiro-Wilk test was chosen due to its stature as one of the most powerful tests for non-normal distributions and has one of the lowest Type I error rates (Öztuna et al., 2006; Shapiro, 2015; Shapiro & Wilk, 1965). Additionally, the Shapiro-Wilk test is employed in studies with relatively small samples (Shapiro & Wilk, 1965; Romão et al., 2010). Because the data were not normally distributed, a non-parametric statistic was used for the correlation analysis. Therefore, to measure the strength and direction of the association between the variables, we used Spearman's ρ, which is a non-parametric statistic. Spearman's ρ is determined using Equation 2,

$$(2) \qquad \rho = 1 - \frac{6\sum d_i^2}{n(n^2) - 1}$$

In this equation, d_i^2 is the difference between the two ranks. Additionally, *n* represents the number of observations in the study. Spearman's ρ assesses the monotonic relationship between the variables. The relationship may show that as one variable increases, the value of the other variable also increases. However, the monotonic relationship may also indicate that as the value of one variable increases, the other variable value decreases. A Spearman's ρ of 1 shows a perfect positive correlation between the variables (i.e., as one variable increases, so does the other), while a ρ of -1 shows a perfect negative correlation. Correlational analyses were conducted using R (version 421, 2023.06.0).

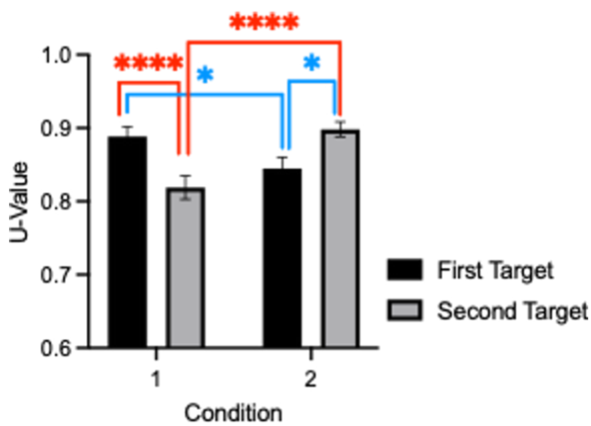
Upon analyzing the results, it became apparent that some data points may have been outliers. We also had four participants who had technical difficulties in the behavioral variability task. We removed five participants who were outliers. Thus, nine in total were removed. Potential outliers were identified using the interquartile range of the data multiplied by three times (IQR*3). The interquartile range is a measure of the spread of the data, essentially a measure of statistical dispersion (Bock et al., 2000; Mishra et al., 2019). Each quartile represents one-fourth of the data, and the interquartile range signifies the difference between the 25th and 75th percentiles. This spread was extended to three times the interquartile range. Participants whose data fell outside this range for at least one dependent variable were excluded. Utilizing this approach, data from five participants were identified as probable outliers on at least one dependent variable; therefore, these participants were excluded from the second analysis. This reduced the data set to $n = 53$ participants.

An a *priori* power analysis was conducted using G*Power to estimate the necessary sample size required to ensure sufficient power to detect a significant correlation. To detect a significant correlation with a moderate effect size ($\rho = 0.4$), assuming a two-tailed test, an alpha level of 0.05, and high power (>0.8), a sample size of 44 would be required. Since no previous research has investigated the relationship between behavioral variability and screen time, we proposed using a sample size of 50 for this study. Fifty-eight participants completed the study with usable data, and 53 remained after removing probable outliers.

Results

Participants performed highly variably on the rectangle task, as evidenced by high U-values and points earned for most rectangles created. Although participants' performance was highly variable in both conditions across both dimensions, size and location, they did show a differential responding according to the contingencies in place. As shown in Figure 1, U-values were generally higher for the target dimension in each condition. The results of the 2 x 2 repeated-measures two-way ANOVA showed no main effect of the condition [F = 2.613 (1,114); p = 0.1088] or dimension [F = 0.2566 (1,114); p = 0.6135]. There was a significant interaction between dimension and condition [F = 31.17 (1,114); p < 0.0001]. During Condition 1, U-values were significantly higher for the first target dimension than the alternative dimension (p = 0.0009). During Condition 2, U-values were significantly higher for the second target dimension than the alternative dimension (p = 0.0136). Additionally, U-values for the first target dimension showed a significant decrease from Condition 1 to Condition 2 (p = 0.0118), and U-values for the second target dimension showed a significant increase across conditions (p < 0.0001). Together, these results indicate that the contingencies controlled levels of behavioral variability. Participants' rectangles varied more along whichever dimension was required to produce points, and their levels of variability adjusted when the contingencies changed across conditions. According to these results, the rectangle task successfully reinforced variable responding of specific dimensions, indicating strong experimental control and an accurate assessment of behavioral variability.

Figure 1.
Levels of Behavioral Variability in the Rectangle Task

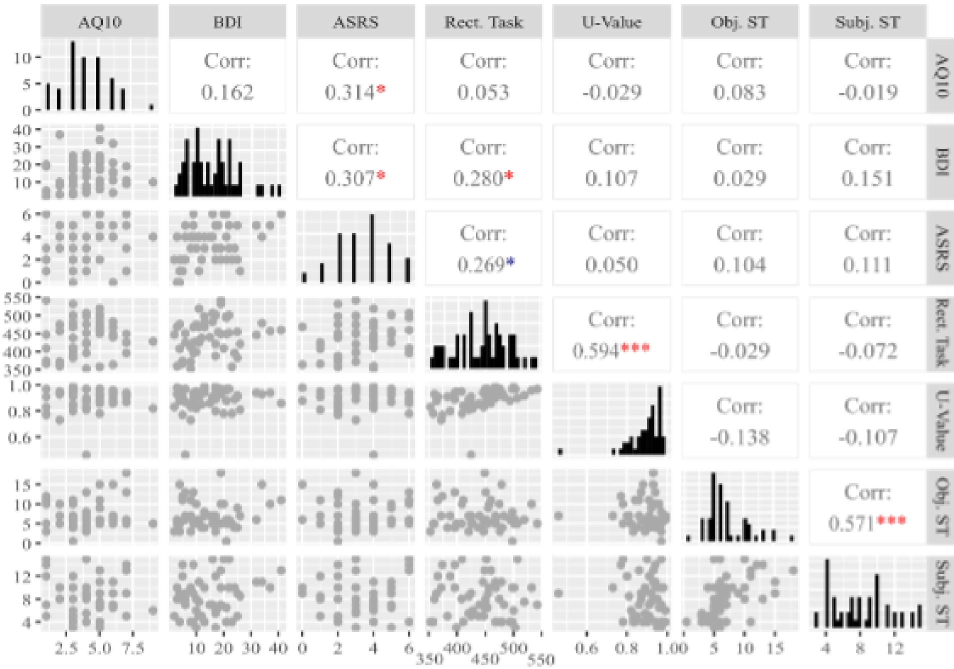


Note: Bars represent mean U-values (error bars represent SEM) for all participants (n = 58). Significant within-subjects comparisons are identified.

* p < .05
**** p < .0001

Figure 2 displays a correlogram for the 'IQR*3 Data' set (n = 53). In this figure, the right-most panels show the ρ correlation for each comparison, the left-most panels show scatter plots for each comparison, and the center diagonal panels show frequency histograms for each variable.

Figure 2.
*Correlogram for IQR*3 Data Set*



Note: The right-most panels show the ρ correlation for each comparison, the left-most panels show scatter plots for each comparison, and the center diagonal panels show frequency histograms for each variable. The variables being compared were defined as follows. AQ-10 = scores on the AQ-10 assessment of ASD symptoms; BDI = scores on the BDI-II assessment of depression symptoms; ASRS = scores on the ASRS v.1.1 assessment of ADHD symptoms; Rect. Task = number of points earned on the rectangle task assessing behavioral variability; U-Value = level of behavioral variability observed for the target dimension during the first condition; Obj. ST = objective measure of screen time, taken from the participant's smartphone. Subj. ST = subjective measure of screen time, estimated by the participant prior to verification on the smartphone.

* p = .05
* p < .05
** p < .01
*** p < .001

As shown in Figure 2, several positive associations were seen between the different psychopathology screeners, the behavioral variability task, and the screen time measures. The strongest correlation was observed between U-values and the number of points received in the rectangle task (ρ = 0.594). This moderate correlation supports the validity of the behavioral variability task. Specifically, when participants behaved more variably (higher U-values), they scored more points, which is the purpose of the task. The next strongest positive correlation (ρ = 0.571) was found between objective and subjective screen time use. This association may suggest that participants can provide a relatively accurate estimate of their screen time use.

Several small-to-moderate positive associations were also observed in the psychopathology measures. Scores on the ASRS and AQ-10 were positively correlated (ρ = 0.314), indicating that participants who tended to score highly on the ADHD screener also tended to score highly on the ASD screener (Dancey & Reidy, 2007). There was also a small positive association between BDI-II scores and ASRS scores ($\rho = 0.307$), indicating a possible relationship between symptoms of depression and ADHD. These detections are consistent with previous findings that suggest that individuals often receive comorbid diagnoses of ASD and ADHD, as well as depression and ADHD (American Psychiatric Association, 2022). Weak positive correlations were observed between BDI-II scores and the points earned on the rectangle task ($\rho = 0.280$) and between ASRS scores and points earned on the rectangle task ($\rho = 0.269$). These results suggest that individuals with more symptoms of depression or more symptoms of ADHD behaved more variably.

Discussion

The study aimed to examine the potential relationship between smartphone screen time, self-reported ADHD, ASD, depressive symptoms, and behavioral variability. For this research, we hypothesized that higher screen time would negatively correlate with variability and that scores on the ADHD, ASD, and depressive scales would either mediate or increase this negative correlation. We utilized the behavioral variability task previously tested by Galizio et al. (2020) to measure the behavioral variability of the participants. This task was performed similarly to the 2020 study, in that participants earned points for creating rectangles in a variable manner, and similarly high levels of variability were observed.

Contrary to our hypothesis, levels of variability were not systematically correlated with screen time. However, other meaningful relationships were uncovered. The study found a moderate positive correlational relationship between U-values in the rectangle task and the points earned in the rectangle task. This correlation indicates that U-values were related to the number of points earned in the study (i.e., the more points earned, the higher the U-value given to the participant), which, consistent with previous literature, may confirm the task as an accurate assessment of behavioral variability (Galizio et al., 2020). This relationship may also provide additional credence to the continued use of the rectangle task in future research. Although behavioral variability is still not completely understood, the internal validity of the point system and U-values for the participants appears valid.

An additional correlation noted is a moderate positive correlation between the subjective and objective screen time scores. This correlation suggests that participants could predict their screen time usage relatively accurately. This finding differs from previous research, which suggests that participants were unable to accurately report their screen time use (Hodes & Thomas, 2021; Ohme et al., 2021). However, it is worth noting that the description of the experiment in the present study may have influenced participants' estimation of their screen time. Because the study description explicitly stated that the research was related to screen time, one of the inclusion criteria was that participants had to have the screen time tracking app activated on their smartphone for at least a week prior to their sign-up time. It is likely that students had already checked their screen time usage before arriving at the study and were thus able to report their use on the subjective measure, which is equivalent to the usage report provided by the objective measures. This behavior was observed in a few participants in the study, who arrived at the study room with the screen time applications already pulled up on their phones and with their screen time usage visible. Future research should examine whether participants can accurately report their screen time use without first consulting their apps.

Weak-to-moderate positive correlations were also observed between scores on the psychological assessments. Our results showed a positive association between ASD and ADHD symptoms, which is consistent with reports that these two conditions are often diagnosed comorbidly (American Psychiatric Association, 2022). However, it is also possible that participants' scores were similar across assessments due to the content similarity within items on the AQ-10 and ASRS-v1.1. More in-depth diagnostic tools would likely represent symptoms better than the 10-item and 6-item self-report assessments. A similar association was observed between ADHD and depressive symptoms. Again, the ASRS-v1.1 and the BDI-II share resemblances in the specific items within the screeners, which could explain this correlation. It is also possible that the scores on these two assessments were correlated due to the population used in the study. Anxiety, indecisiveness, and an unfocused nature are typical for a significant minority of college students (Healthy Minds Study, 2020). This trend for many college students indicates that there may be a slightly higher-than-average score for college students on both the BDI-II and the ASRS-v1.1.

Two additional correlations are particularly noteworthy. Although these correlations were weak and only revealed after excluding probable outliers from analysis, they raise questions about interpreting the existing literature and therefore warrant further exploration. First, performance on the rectangle variability task was positively associated with scores on the ADHD screener. The existing literature on the relationship between ADHD symptoms and levels of behavioral variability is mixed. Some previous research suggests that people with symptoms consistent with an ADHD diagnosis often display more variable behavior than their neurotypical peers (American Psychiatric Association, 2022; DuPaul et al., 2001; Neuringer, 2009). Similar findings have been demonstrated in rodent models of ADHD (Hunziker et al., 1996; Mook et al., 1993). However, other research has failed to demonstrate this relationship; Saldana and Neuringer (1998) compared behavioral variability in a computer game across children with and without an ADHD diagnosis. Although the individuals with ADHD engaged in more off-task responses, their behavior in the task was not significantly more variable than controls. The mixed nature of this research indicates a need for more systematic study of the potential relationship between ADHD and behavioral variability.

The second noteworthy correlation not entirely consistent with previous research was between behavioral variability and depression. Very little research has examined the relationship between variability and depression. Hopkinson and Neuringer (2003) found that more depressed individuals behaved less variably than controls. According to the diagnostic criteria, symptoms of depression include loss of interest or pleasure in activities, psychomotor retardation, low energy levels, and difficulty making decisions (American Psychiatric Association, 2022), all of which would likely lead to more repetitive, less variable behavior. In the present study we observed the opposite relation—a weak positive association between performance on the rectangle variability task and scores on the BDI-II assessment of depressive symptoms. Given these inconsistencies, future research will be needed to establish the directionality and strength of the relationship between variability and depression.

Limitations and Future Directions

Several limitations exist for this study. One is the measure of screen time used. Although the ScreenTime and Digital Wellbeing® applications possibly reduce the subjectivity of utilizing self-report measures that have been used in other studies (Chonchaiya et al., 2011; Jari et al., 2014; Jones et al., 2021; Keikha et al., 2020; Martin et al., 2021; Olson et al., 2022; Slobodin et al., 2019). Due to the novel nature of the applications, their reliability and validity remain in question. Another limitation is that a few survey participants reported being confused about the wording of the screen time items. The participants were asked to estimate their daily average screen time in hours from the past week, yet they may have been confused about if their estimate should have been their total weekly usage or average daily usage. Clearer wording in future research would address this potential concern. Another limitation of the study regarding the screen time assessments is the one-week activation period required for the screen time applications used in the study. This requirement necessarily limits the number of participants that could be included in the study. Additionally, simply owning a smartphone limits the type of individuals who can be involved in the study. Individuals with a smartphone may have different screen time habits and usage than those without a smartphone.

The psychopathology screeners we used also have limitations. First, given the nature of ASD and how different each presentation can be, depending on the individual, it can be difficult to regard a short screener as being able to ascertain common autistic behaviors accurately. For example, in creating the screener, 90% of the adults who took the test, who were a part of the autism group, were diagnosed with Asperger's (Allison et al., 2012). This diagnosis is now outdated with the Diagnostic Statistical Manual, 5th Ed. update (American Psychiatric Association, 2022). In addition, the specific nature of the behaviors exhibited by the adults, from which the screener was created, may limit its generalizability to other, different presentations of adult autism.

The Beck Depression Index (BDI-II) has several crucial limitations. First, the BDI-II only measures an individual's feelings over the past two weeks (Beck et al., 1961). This feature could be a potential drawback because it limits the ability to measure or understand a person's historical depressive states. For example, persistent depressive disorder, a disorder that is characterized by long-lasting depressive symptoms, may be unrealized if a person were to take the BDI-II and not feel depressed or distraught for the past two weeks. Further, the discriminant validity of the BDI-II. Although Beck et al. (1961) can demonstrate the discriminant validity between depressives and nondepressives, it is less effective at discriminating between other disorders or symptoms such as anxiety (Richter et al., 1998). This limits the ability of the BDI-II to accurately assess if a person has depression. Finally, researchers have noted the instability of scores over a single day (Richter et al., 1998). Participants instructed to take the BDI-II at different times during the day received different scores overall. Again, this may be due to the nature of the BDI-II, which focuses on short-term, current issues.

The Adult ADHD Self-Report Scale (ASRS-v1.1) utilized in our study to measure ADHD symptoms is limited due to its highly brief nature. Although Kessler et al. (2004) suggest that the short, 6-item version can function and assess the same ADHD symptomology as its 18-item counterpart, the screener may still have inefficacies. Furthermore, the ASRS-v1.1 is hindered by its relatively small sample size (compared to its original, longer predecessor). The ASRS-v1.1 was created using a subsample of 154 participants of its original 9083 participants, which may limit its generalizability.

The behavioral variability task demonstrates several limitations. One limitation lies in its content validity. It is unclear if a participant who scores highly on the behavioral variability task is more behaviorally variable globally (outside of the study), or outside of a lab setting. Some parts of the task may have led to boredom or decreased motivation due to its stagnant nature and arbitrary point values. Also, the compensation for participating in the study was course credit, but performance on the task had no impact on receiving it. Another potential factor was the lenient variability requirements; this study utilized a threshold value of 0.20. This value means that for a point to be delivered, the rectangle had to be in a category of the target dimension (time or location) where 20% or fewer of the rectangles occurred. The data may have differed if more stringent or lenient requirements had been used. Another limitation of the task is the use of U-values to measure variability (Galizio et al., 2020). U-values cannot explain a participant's specific response patterns, instead measuring variability on a general, global level.

Several different future directions can be taken in subsequent research. Additional research should be conducted to determine if the behavioral variability scores in the task can generalize toward behavioral variability outside of a controlled environment. Although the task has been used to assess behavioral variability in a controlled setting (Galizio et al., 2020; Ross & Neuringer, 2002), future studies could replicate the task and conduct additional follow-up assessments of behavioral variability using different methods. For example, future studies may use the rectangle task and behavioral observations to assess a participant's behavioral variability in a less structured environment. An additional element that may be effective is a monetary component. For example, future research could reward participants with a monetary reward based on the points they earned in the behavioral variability task. Additionally, the study could be larger, and involve a more diverse sample. The demographics of the study align with those of (blinded) (National Center for Education Statistics, 2021). Most of the students were younger, aged 18 to 24 years old. There was a difference between the participants' and their parents' education levels. Future research could conduct even more diverse sampling to understand influences that may change a person's behavior or screen time usage. Due to the simplicity of the methods used in the study, many other individuals would be eligible to participate.

Conclusion

Our findings continue to validate the utility of the behavioral variability task used in previous studies (Galizio et al., 2020; Ross & Neuringer, 2002). In addition, using objective screen time measures (such as ScreenTime and Digital Wellbeing systems) opens the door to additional insights into total screen time usage, as well as screen time associated with different adaptive or maladaptive behaviors. The correlations found in the study between some of the other screeners may also help inform clinicians in applied psychological testing environments and initiate further use of the screeners to identify specific behavioral traits. Although no significant correlation was observed between behavioral variability and screen time, this study adds to the limited research exploring the relationship. Future research will surely lead to greater understanding of how screen time and behavioral variability may be connected.

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Reading Practices of the MTSU Community

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ABSTRACT

While the cognitive and emotional benefits of reading are well documented and researched, many adults report difficulty sustaining reading practices due to time constraints, limited access to engaging materials, and a lack of guidance or support. To better understand these challenges, we conducted a study to explore the reading habits, obstacles, and motivations of adult readers within the MTSU community, including students, faculty, and staff. The study employed a mixed-methods approach, combining existing scholarly research with an MTSU Institutional review Board-approved Qualtrics© survey distributed between April and July 2025. The survey collected both qualitative and quantitative data on participants' reading habits, perceived benefits, and obstacles, yielding 313 responses. Findings indicated that although many adults have the desire to read more, there are structural and motivational barriers that often prevent sustained engagement. Based on these findings, we propose community-centered, educator and librarian-led strategies to alleviate reading barriers, such as book clubs, digital media literacy, reading kits, reading challenges, and workshops. By fostering creativity, support systems, and intentional collaboration, we seek to reengage adults with reading and build long-term, enriching, and meaningful reading habits.

Introduction

Considerable time, effort, and resources are devoted to supporting the development of early readers. In childhood and adolescence, reading has a framework: structured curricula, accountability systems, guided encouragement. Yet as individuals transition into adulthood, these external supports largely disappear, and reading becomes a self-directed practice. This is the point at which many adults report a decline in reading frequency and motivation, despite continuing to possess the view that reading is valuable. This study seeks to understand that transition, in an effort to address why reading habits have become difficult to sustain once formal support structures are removed. How, we ask, can adults be supported in reengaging with reading on their own terms?

Reading is universally recognized as a fundamental element of the human experience—a practice that supports intellectual development, emotional growth, and cultural understanding. However, contemporary research highlights tensions between this perceived value and shifting engagement patterns shaped by time constraints, the rise of digital media, lack of access, and evolving entertainment habits (Gelles-Watnick & Perrin; Faverio & Perrin). Although technological change has expanded reading formats through e-books and audiobooks, it has introduced myriad new forms of distraction, reflecting broader transformations in how individuals locate, consume, and prioritize texts (Pew Research Center). These shifts suggest that reading practices today are influenced as much by lifestyle and access as by individual interest.

Scholars further emphasize the role of autonomy and early reading experiences in shaping lifelong engagement. Studies of adolescent motivation indicate that agency and genre choice significantly influence willingness to read independently (Webber et al.), while research on negative reading histories demonstrates how early academic struggles can produce long-lasting disengagement from reading practices (Hall). At the same time, educators argue that exposure to intellectually challenging texts remains valuable for cognitive growth, highlighting a persistent tension between reading for pleasure and reading for development (Gallagher). Together, these contemporary conversations about reading reveal a reflective and dynamic landscape where the value of reading endures and overcomes all the while the ways and reasons people read continue to evolve.

Central to this evolving understanding is the recognition that reading is often described as a source of knowledge and entertainment, but also a profound emotional and existential lifeline, especially for older adults. For many, reading connects them to meaning, purpose, pleasure, and social connection (Rothbauer and Dalmer 170), existing as a vital part of their well-being and sense of identity. This emotional relationship with reading shows its role as more than a recreational activity; it is also a way for people to find comfort and connection. In addition, there is growing recognition that truly engaging in reading requires a mindful and intentional approach. Rather than just consuming texts, readers benefit from immersing themselves in the experience and reflecting on the significance of what they read. Deeper engagement such as this transforms reading into a deliberate and enriching practice that can create lifelong appreciation and connection to literature. These perspectives underscore reading as an emotional foundation and a meaningful process that shapes identity and well-being over time.

Thus, although reading continues to hold significant cultural value, a growing number of sources suggest that many adults in the U.S. are reading less, and sometimes not at all, suggesting a decline in the frequency of adults reading. According to a 2021 Pew Research Center report "Who Doesn't Read Books in America," nearly one in four American adults said they hadn't read a book in any format, including print, digital or audio, over the past year (Gelles-Watnick and Perrin). Still, these patterns are not evenly distributed, and research shows that adults with college degrees are significantly more likely to read than those without, and higher-income adults read more than lower-income adults. This underscores that reading practices are shaped by privilege and access, where those with educational privilege have more access to books and more positive associations with reading.

Beyond functional or academic outcomes, reading is also understood as an emotionally meaningful and identity-forming practice. Research with adult readers suggests literature provides connection, purpose, and well-being (Rothbauer & Dalmer), while broader cultural commentary such as Maria Popova drawing from author and philosopher Alain de Botton, who positions books as tools for reflection and emotional articulation that support navigating human experience, while they help us "live and die with a little bit more wisdom, goodness, and sanity" (Popova). Yet despite these benefits, global data indicates decreasing voluntary reading engagement amongst young people, raising concerns about long-term reading motivation into adulthood (Webber et al.). When thinking about what might account for the changes in adult reading habits, it's possible that part of the issue is that adults are made to feel that what they enjoy does not count as reading. Reading can be enjoyable and intellectually challenging and while motivations to read vary, there is not a "wrong" reason to read.

Rather than assuming disengagement, this study approaches adult reading as a complex and evolving practice shaped by motivation, access identity, and social support. By focusing on adult readers within the MTSU Community, this research examines adult readers' self-reported reading habits, perceived obstacles, motivation, and benefits.

This study highlights the personal, intellectual, and cultural benefits of literature. Reading can support life-long learning, broaden one's worldview, and foster emotional well-being. By drawing attention to these benefits, this study advocates for more inclusive and accessible reading practices that empower adults to engage with texts on their own terms. It is not just designed for readers, but for educators, librarians, and community organizers invested in adult literacy and life-long learning.

Literature Review

A recurring theme in current literature regarding reading is the importance of choice and autonomy in fostering lifelong reading habits. The idea of choice and reading a variety of genres is prevalent in literature, as young adults would feel more prone to make an autonomous choice to read if they had a guide or recommendations on what to choose (Webber et al. 85-86). In school settings, books are usually chosen for students, so when one transitions to adulthood, one may be left wondering how and what to read. In their article, "Motivating Book Reading During Adolescence: Qualitative Insights from Adolescents," Webber et al. describe their study as aiming to understand young people's motivation to read on their own. The results underscore how the lack of reading agency in school settings during youth could contribute to feelings of uncertainty about what and how to read later in life. If adults were never given a choice of what to read as students, how would they know what to choose on their own? A participant in the study expands on this notion by saying, "When you read different books in school, if you're enjoying them, it gives, like, more if an insight of why you would read at home" (85). Supporting reading choices in school settings may set adults up for when they are left to read on their own, as when one explores new genres and finds something they like, this may lead to a personal interest in reading. (86) This is an important notion as the lack of early exposure to a variety of genres or reading choices can harm adult literacy, as reading can be seen as inaccessible or intimidating to navigate by oneself.

The idea of guided autonomy is echoed in Kelly Gallagher's work, specifically *Readicide* and *Deeper Reading: Comprehending Challenging Texts*, 4-12, where he advocates for a "balanced reading diet" that includes reading intellectually challenging texts alongside equally engaging and enjoyable material to prevent burnout from only reading academic texts. Gallagher argues that while challenging texts cultivate intellectual depth and mental stamina, one should not neglect enjoyment, as pleasure and difficulty can balance each other out. Webber et al. expand on the idea of variety in terms of reading and argue that young adults would feel more likely to read independently if provided with guidance or recommendations on what to read. Guidance and agency are two different things, yet they can complement each other when aiding young readers to seek out mindful reading choices that will hopefully guide their further reading practices as adults. When Gallagher's ideas are considered alongside Webber et al.'s study, it becomes clear that reading habits formed in youth, whether they be empowering or restrictive, can affect adult perceptions of reading as a meaningful practice or a burdensome task.

Much like the formative nature of early reading experiences, the acceleration of digital media exerts significant influence over adult reading habits. Daniel Keller's Chasing Literacy explains how reading can become an afterthought with the acceleration of online media. He suggests that these competing forms of media harm reading tangible literature, as he says, "We live in a culture that urges and thrives on speed and efficiency; capitalism demands getting rid of the old to make room for the new" (Keller 69). This points to a cultural shift where quick information consumption is favored over deep engagement. Scrolling aimlessly is much easier to do than sitting down and reading a book. When Keller interviewed high school and college students about their habits when scrolling on the internet, a participant stated, "I don't mean to spend so much time online, but after a while, you look at the clock and wonder how an hour went by" (Keller 85). We can unknowingly hinder our reading practices by passively consuming digital media. One may struggle to read not because one dislikes reading, but because digital environments are made to consume our time without us realizing it, leaving us no room for other activities.

The influence of digital media is far-reaching, with its effects becoming increasingly measurable across many populations. A 2025 Pew Research Study "Teens, Social Media and Mental Health" found that 45% of teens report spending too much time on these platforms, notably a substantial increase from 36% in 2022 (Faverio et al.). Additionally, nearly half (48%) perceive social media as having a mostly negative effect on their peers, suggesting a growing awareness that digital environments may disrupt one's well-being. These patterns highlight the possibility that the dominance of digital media impacts reading and even mental health across all ages, contributing to reduced attention spans and little time for reflective reading. The appeal of quick, visually engaging content can easily overpower text-based literature.

Yet, as evident in Leigh A. Hall's exploration of interactive reading apps, digital environments also hold potential to reframe reading as accessible and engaging. In her article, "How Youth and Adults with Negative Reading Histories Found a Way to Enjoy Reading," Hall redirects the idea of online media competing with tangible literature and finds how online applications may assist with youth and adults becoming engaged with reading again. She explains how the app *Delight Games*, which includes interactive novels, narrative gameplay, and the option to create one's own stories could help youth and adults reengage with reading after past negative experiences when reading. Hall focuses on the challenges adults face, noting that "Within this group of respondents, five youths and 37 adults self-identified as poor readers and claimed that they did not enjoy reading" (676). Many of these adults recalled feeling inadequate as readers during their youth, believing they were not smart enough to understand the material or that they could not simply read for enjoyment. These early experiences contributed to their limited relationship with reading later in life. Online platforms such as Delight Games explore narrative gameplay that lets readers feel a sense of agency, and this sense of control can be crucial in reframing adults' perceptions on reading as something empowering, not burdensome (Hall 678-679).

The Pew Findings exist as common ground between insights from Hall and Keller, as many teens recognize the negative effects of digital media and there are a majority who still view social media as spaces for creative expression (63%) and connection (74%). This gives digital media dual abilities to distract and enable, suggesting that reading practices can coexist with digital engagement and promote further literacy. Thus, technology can both inhibit and facilitate adult reading, depending on how it is.

Beyond questions of media competition, scholarship consistently emphasizes reading's cognitive and developmental value. Maryanne Wolf in *Proust and the Squid*: *The Story and Science of the Reading Brain* emphasizes that reading is a biologically unnatural act that must be continuously developed. Drawing on neurological studies, she warns that "all adolescents go through key development brain stages and that when they are not stretched in these periods of life their cognitive windows run the risk of shutting down" (Qtd. in Gallagher 57). Similarly, research on cultural competence highlights reading's social and ethical impact. Gloria Ladson-Billings frames cultural competence as the ability to engage with multiple cultural perspectives, while Rudine Sims Bishop's metaphor of mirrors, windows, and sliding glass doors positions literature as both reflective and expansive, enabling readers to affirm identity while encountering diverse worldviews. Together, these frameworks underscore reading's capacity to foster empathy, awareness, and connection in increasingly global contexts.

Reading's emotional and existential benefits are particularly evident in adulthood and aging. Rothbauer and Dalmer describe reading as a "lifeline" that connects older adults to meaning, pleasure, and identity, as they say, "Whatever is on the other end of the lifeline varies from reader to reader, but the older participants in this case give ample evidence that reading does connect them to meaning, to purpose, to pleasure, to people, and to the world" (170). Participants reported using reading to cope with physical pain and maintain agency, demonstrating its role in emotional sustenance and well-being. Currie et al. extend these findings through interviews with adults aged 63–83, showing that fiction reading promotes belonging, joy, and personal growth while strengthening empathy and self-reflection (5). These studies collectively position reading as central not only to cognitive engagement but to emotional resilience and social identity across the lifespan.

Calling for beneficial reading and deepening one's experiences with reading, Ellen C. Carillo's work offers a reflective framework that positions reading as not only a beneficial practice, but a deeply intentional one. In *Securing a Place for Reading in Composition*, Carillo writes, "The term 'mindful,' when modifying reading, describes a particular stance on the part of the reader, one that is characterized by intentional awareness of and attention to the present moment, its context and one's perspective" (118). Becoming a mindful reader is a way to rediscover reading and see it in a new light, appreciating it more than one once did, by immersing oneself in a text and doing more than just reading but deliberately reflecting on the experience of reading. Carillo describes how she uses this term of mindfulness to "underscore the metacognitive basis of this frame wherein students become *knowledgeable, deliberate, and reflective* about how they read and the demands that contexts place in their reading" (117). Mindful reading thus offers a framework for reconnecting adults with literacy by shifting reading from passive consumption to purposeful engagement.

While existing literature offers valuable insight into the cultural, emotional, and social benefits of reading across the lifespan, as well as challenges that are associated with reading engagement, there remains a gap in observational studies that explore the reading practices of adults outside of academic contexts. Most of the literature seems to focus on the development of adolescents, structures in schools, or older adult reading habits, but few studies directly examine how everyday adults are personally engaging with reading and what motivates and discourages them. Little research attends to how these adults perceive the value of reading beyond academic contexts. Still, these trends suggest that reading is not disappearing, but it is constantly changing, and access, background, emerging digital media, and personal preference all influence and shape who reads, how often they read, what they read, and how they engage with texts. By examining the reading practices, motivations, and perceived obstacles of adults within the MTSU community, this study contributes observational data to an underrepresented area of literacy research. It foregrounds adult readers' voices and situates their experiences within broader conversations about agency, digital media, and mindful engagement. In doing so, the study offers insight into how reading continues to evolve and how intentional, community-supported stages may sustain adult literacy and enjoyment of reading.

Methodology

To examine the reading practices of adults within the MTSU community and offer practical recommendations, this study employed a mixed-methods survey design. The survey was designed to collect both quantitative and qualitative data from MTSU students, faculty, and staff in order to gauge reading practices, perceived benefits and obstacles, and factors that might motivate increased reading engagement. Following approval from the MTSU Institutional Review Board committee, they survey was administered through Qualtrics©. The IRB committee reviewed the submission to ensure participant protection and evaluate potential risks. The survey was distributed via e-mail to all MTSU faculty and staff members as well as the MTSU Honors College between April and July 2025, receiving a total of 313 responses.

The quantitative component of the study involved calculating response percentages and identifying dominant patterns related to participants' reading habits, perceived benefits of reading, obstacles to reading, and motivators for increased engagement. Data was then organized and analyzed using Microsoft Excel, allowing for the identification of trends and correlations within the dataset. Visual representations, including bar charts, pie charts were created to clearly illustrate the distribution of responses. The quantitative analysis helped evaluate whether existing findings in literature held true within the MTSU community and if MTSU adult readers found value in reading literature as an adult.

To complement the numerical data, the survey included open-ended responses questions that allowed respondents to elaborate on their personal reading experiences, motivations, challenges, and value related to reading outside of academic requirements. These responses provided deeper contextual insight into participants perspectives and experiences. Qualitative data was analyzed through manual coding techniques informed by Geisler and Swart's *Coding Streams of Language*, including guided exploration and attention to recurring themes (32). Responses were coded according to patterns relating to enjoyment, motivation, obstacles, values, and self-directed reading practices.

In addition, Rothbauer and Dalmer's framework was applied to categorize qualitative responses into four thematic areas: purpose, pleasure, connection to people, and connection to the world. Responses coded as purpose reflected reading as a lifelong or meaningful practice. Pleasure encompassed enjoyment and emotional connection to texts or characters. Connection to people included references to social engagement through reading, such as discussion or shared experiences. Connection to the world captured responses describing reading as a means of cultural understanding or exposure to diverse perspectives. Further analysis drew on Geisler and Swarts's concept of code schemes, focusing on "words and phrases that indicate values, attitudes, and beliefs expressed in the verbal data stream" (124).

Using a mixed-methods approach allowed for a comprehensive analysis of adult reading practices within the MTSU community. Quantitative data addressed "what" questions regarding reading behaviors and attitudes, while qualitative data provided insight into the "why" and "how" behind those patterns. By analyzing both data types in tandem, this study was able to capture not only measurable trends, but also the values, motivations, and beliefs that shape adult readers' relationships with reading. This integrated approach contributes a nuanced understanding of adult literacy and self-directed reading practices.

Results

Demographics and Participants

The survey was distributed on April 23, 2025, and closed on July 9, 2025, yielding 313 responses. Participants were primarily aged 45 and older (56%), followed by ages 35–44 (19%), 25–34 (13%), and 18–24 (11%). The majority identified as female (73%), with 22% male, 3% non-binary, and 2% preferring not to disclose gender. Respondents were predominantly MTSU faculty (46%) and staff (31%), with students representing 12% and administrators 11%.

Self-directed reading practices

Most participants identified as readers, with 87% reporting that they consider themselves readers (Figure 1). Self-directed reading frequency was high: 47% reported reading "very frequently," 27% "frequently," and 18% "occasionally," while only 6% reported reading rarely and 1% never. These results indicate sustained engagement with independent reading among respondents, aligning with the broader argument that adult reading motivation often stems from autonomy rather than obligation; an idea central to contemporary literacy studies, and this project's emphasis on engagement driven by values.

Participants reported a wide range of genre preferences. Fiction was the most selected category (17%), followed by Non-fiction (13%), Mystery/Thriller (11%), Historical Fiction (10%), Biography/autobiography (9%), Fantasy (8%), Science fiction (7%), and Self-help/Personal development (7%). Smaller percentages consisted of Romance (6%), Other (5%) graphical Novels/ Comics (4%) and Poetry (3%).

Respondents who selected "Other" were asked to specify additional genres and forms of reading they enjoyed. Although representing a small portion of responses, this category included diverse materials such as horror, religious texts, academic articles, magazines, catalogs, and investigative journalism. Participants were also asked whether they engaged in reading outside of literature (e.g., news, blogs, magazines). Because this study adopts a broad definition of reading, respondents determined what qualified as reading within their own practices. Their responses demonstrate that reading frequently extends beyond literary texts into informational and interest-driven media, reinforcing Keller's argument that contemporary reading manifests in diverse forms shaped by digital engagement and personal interest rather than strictly literary habits.

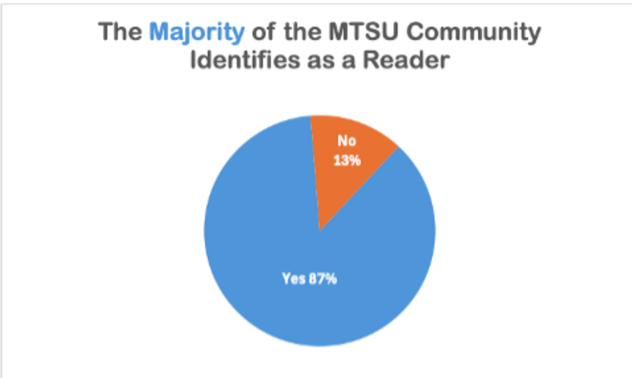

Figure 1

Benefits

The central goal of this study was to examine how respondents define the benefits of reading and how those perceived benefits motivate engagement. Participants described enjoyment in varied ways, including immersion and escapism, with one noting that reading allows them to "disengage and take yourself into another time or place." Many also reported identifying with characters, suggesting that reading fosters emotional reflection and connection, consistent with Rothbauer and Dalmer's claim that reading sustains identity and one's sense of place in the world.

Responses also revealed tension between reading for intellectual growth and reading for escape. Some participants emphasized knowledge acquisition and academic development, echoing Gallagher's argument that reading provides enduring cognitive value (57). Others valued reading precisely for the opposite reason because it allowed them to disengage from academic thinking. These answers convey the value that comes from reading that Gallagher speaks of but completely contrast with answers of other participants who find value simply in enjoying a book and escaping everyday life.

This contrast suggests that adult readers navigate competing perceptions of reading as both intellectual labor and leisure. As Rothbauer and Dalmer observe, reading often evolves into a personal and affective practice over time, providing comfort, meaning, and connection beyond academic purposes. Participants' responses similarly indicated that reading functions simultaneously as pleasure, emotional engagement, and social connection. Rothbauer and Dalmer explore this idea in their study of reading as a lifeline in older adults' lives as a participant in their study stated, "I used to when I was younger, --I would often read for information. I don't do that so much anymore. I just read for enjoyment" (169-170). This parallel between the MTSU community and Rothbauer and Dalmer's participants suggest that as adults grow, reading becomes a more personal and emotional experience, one that brings *purpose* to life, as a self-sustaining practice providing comfort, escape, and meaning beyond academic purposes. Rothbauer and Dalmer emphasize that adult reading becomes an act of both pleasure and connection, pleasure in narrative immersion and reflection, but also connection to others and the world beyond the page. Their participants described reading as a practice that sustains identity, creates a sense of companionship by enabling readers to emotionally engage with characters, and foster a sense of belonging to broader conversations. Similarly, MTSU readers' responses suggest that the act of reading allows them to feel connected to other people and ideas, even when done alone. The data revealed that adult readers find as much value in the emotional and relational dimensions of reading as in its intellectual or escapist aspects.

When asked to identify the most important benefits of reading, personal enjoyment ranked highest (21%), followed by social connection (7%), with other responses distributed across cognitive and cultural outcomes (see Figure 2). Open-ended responses emphasized vocabulary development, comprehension, and understanding the world. These perspectives align with Bishop's concept of "window texts," through which readers engage with broader cultural experiences, and further reflect Rothbauer and Dalmer's findings that reading supports empathy, awareness, and self-understanding. Overall, the data indicates that adult readers value reading as both an inward process of personal growth and an outward means of connecting with culture and community.

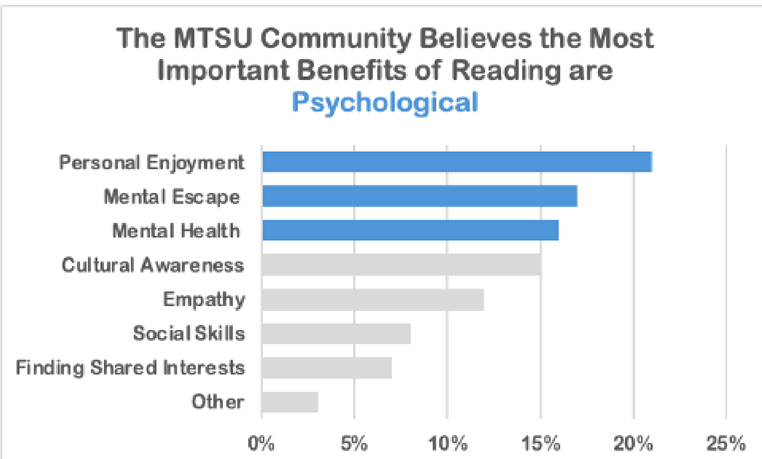

Figure 2

Obstacles

To foster a better understanding of the challenges adults might face when trying to read and how to remedy these barriers, members of the MTSU community were asked to identify the greatest obstacle they face when attempting to read. The choices given were in alignment with previous studies such as Daniel Keller's Chasing Literacy on competing forms of entertainment and Webber et al.'s article on adolescent motivation to read. The results demonstrated in Figure 3 show that lack of time and competing forms of entertainment are the most reported obstacles that participants face when trying to read, with lack of access to reading material and less external engagement being the lowest reported obstacle.

To gauge any obstacles that might have not been listed, participants were asked to specify any other obstacles they face when reading in an open response. Some participants stated that the interest in reading exists for them, but the ability might not match that, with one respondent stating how an obstacle they face is health constraints, or "Being sleepy/tired, sick or unwell, mentally exhausted, etc." This complicates Rothbauer and Dalmer's idea of reading to alleviate pain. While reading may be a lifeline for aging readers, this shows that sometimes the desire is there, but for someone who is struggling, finding the energy to dedicate time to reading can be overwhelming.

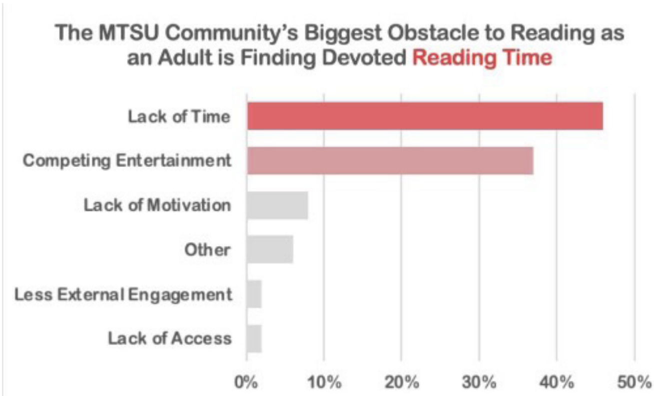

Figure 3

A primary observation of this study is that adult readers often lack the structural support systems present in school settings. Participants were asked whether their reading practices changed once reading was no longer assigned, and most reported a shift. Among those respondents, 61% indicated they read more independently, while 39% reported reading less, suggesting that autonomy can motivate engagement but does not benefit all readers equally.

To capture broader perspectives, participants were asked what aspects of school-based reading they missed, if any. Responses varied from contentment of not having to deal with assigned work as one said, "I want to choose my reading material, not have it assigned" to respondents who felt like assigned work challenged them more to think outside of their own bubble. They stated, "Being 'forced' to read things outside what you prefer, stretches your thoughts, beliefs, and perspectives," a concept that aligns with Gloria Ladson Billings' "cultural competence" that can be found from reading texts one might not reach for initially, but will give them insightful information into other cultures, or others' "thoughts, beliefs, and perspectives," as one respondent described. This shows that even among independent adult readers, there is recognition of intellectual and social growth that comes from encountering diverse texts. Reading can be fostered in many ways, but structured assignments often provide motivation that may be absent in adulthood. Some participants read more with freedom of choice, while others relied on assigned texts for challenge, highlighting diverse motivations and reading habits among adults.

Motivation

The first part of the survey gathered information on the MTSU community's personal reading practices, focusing on their identity as adult readers and the benefits and obstacles associated with reading. Participants were then given a list of factors that might motivate them to read more frequently and asked to select those they resonated with most. As shown in Figure 4, neighborhood or friend book clubs were the most selected option at 29%, followed by setting personal reading goals at 23%. Community or library book clubs accounted for 17%, access to free or low-cost texts 16%, and "other" 15%.

The popularity of both neighborhood-based and community-driven book clubs suggests that many participants value the social dimensions of reading. These shared experiences foster discussion, collective purpose, and belonging. Richard Beach and Steven Yussen argue in "Practices of Productive Book Clubs" that collaborative reading environments encourage interpretive exchange and deepen engagement through shared reflections. This finding indicates that respondents associate reading not only with individual enjoyment or intellectual development but also with social connection. For MTSU readers, reading functions as a means of sustaining community and building relationships through shared texts, reinforcing its significance as both an intellectual and emotional practice.

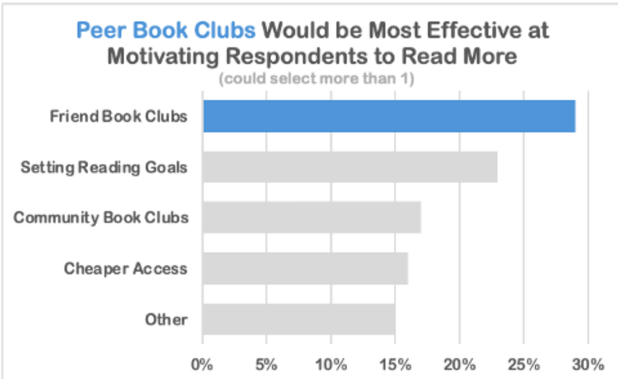

Figure 4

Setting and tracking reading goals emerged as a key motivator in both the literature and survey responses. Leigh A. Hall's study found that the Delight Games app reengaged youth and adults with past reading difficulties by allowing autonomy in reading choice and self-directed progress, a form of agency similarly valued by MTSU respondents. In the survey, setting personal reading goals ranked among the strongest motivational factors, reflecting this emphasis on autonomy. This aligns with Keller's discussion of navigating competing literacies in a digital age, as participants demonstrate adaptability in using tools and strategies to maintain focus and purpose. Likewise, these findings support Webber et al.'s argument that intrinsic motivation thrives when readers exercise choice, suggesting that self-directed goal setting represents a shift from externally assigned reading to personally meaningful engagement.

Open-ended responses further highlighted challenges and motivations shaping this engagement. Participants described "choice paralysis," noting that "so many options and so little time" hinder decision-making, and recommended curated reading lists to reduce overwhelm. Others cited online book groups and podcasts as motivators, while many emphasized time constraints as a persistent obstacle. Together, these responses illustrate that literacy engagement depends not only on motivation, but on navigating abundance of choice, time limitations, and competing priorities.

These findings align with broader literacy research showing that adults value reading as a cognitive, social, and emotional practice. While the structures that once guided their habits have faded, MTSU responses indicate that motivation persists when supported by autonomy, flexibility, and social connection. Like Rothbauer and Dalmer's participants, respondents frame reading not in terms of productivity alone, but as a source of purpose, pleasure, and understanding; a balance that makes up the modern adult reading experience.

Discussion and Recommendations

The findings of this study offer deep insight into adult reading practices, motivators, and obstacles that inform the recommendations that this thesis seeks to address by fostering a supportive and engaging reading culture for adults. Although a strong majority of participants (87%) considered themselves readers, the data reveals significant variation in reading frequency, genre preference, and perceived barriers. These findings seem to challenge the idea that adults are disengaged from reading, but it also highlights the complexity of adult readers and their identities. Some appear deeply immersed, and others struggle due to personal time constraints, motivations, or past negative associations with reading, usually academic ones.

Survey responses demonstrated a wide range of preferred reading materials, including fiction, fantasy, self-help, science fiction, magazines, and academic journals. This diversity of genre signifies the importance of reader agency and choice, a critical insight that demonstrates how adults are more inclined to read if they feel empowered to choose genres that align with their interests and identities. Institutions such as libraries and educational organizations can support adult readers by can support these adult readers by curating inclusive collections, promoting genre diversity, and offering book clubs. Participants most frequently identified personal enjoyment as a primary motivation for reading, followed by immersion, escapism, cultural awareness, intellectual growth, and emotional connection. There is a duality between leisurely reading versus reading for mental and intellectual growth and these responses highlight the need to frame reading not solely as an academic based activity but also a meaningful and recreational practice. Programs designed by educators and librarians should acknowledged this duality by supporting both leisure reading and intellectually enriching engagement, allowing adults to pursue reading in ways that align with their personal goals.

Responses regarding assigned reading revealed mixed attitudes. some participants needed the extra push to read outside their personal preferences, while others turn the other way when they are told what to read, and enjoy the freedom of choosing their own material. Tensions such as this reveal that adults have different motivators, and once again, programs should account for both readers and their preferences. To accommodate both groups, librarians and educators might offer optional reading challenges, thematic prompts, and recommended reading lists that suggest rather than prescribe. Many adults in the MTSU community felt overwhelmed with the volume of reading material that is available and reported having limited time to explore all these options, so these suggestions give adults a chance to look at recommended books to reduce this decision fatigue or choice paralysis.

Lack of time and competing forms of entertainment were the most frequently reported obstacles according to survey results, aligning with research on attention spans and digital distractions from Keller's *Chasing Literacy* and findings from the 2025 Pew Research Center report "Teens, Social Media, and Mental Health" that suggest digital media impacts reading and mental health across all ages. These findings contribute to reduced attention spans and minimal time to read. This presents an opportunity for educators and librarians to explore time-efficient reading opportunities such as short story clubs or "quick read" collections, which often consist of shorter fiction and non-fiction books, usually aimed at adults to read easily while not being faced with lengthy, traditional texts. It can also be noted that while digital tools are often framed as distractions, they can be advantageous and allow for flexible engagement, such as eBooks, audiobooks, and reading apps such as *Goodreads or Delight Games*.

Notably, a popular motivator that encouraged more reading was neighborhood or friend book clubs (29%), followed by personal reading goals that are tracked via apps and challenges (23%). This reinforces the importance of frameworks that rely on goal-oriented tasks to help sustain adult reading habits. Book clubs offer accountability and a sense of community - one that adults might find themselves missing from previous school settings.

Richard Beach and Steven Yussen mention in their article "Practices of Productive Book Clubs" that book clubs become productive when they foster collaborative dialogue, shared interpretations, and balance between structure and reader autonomy (122). This gives adults something to capitalize on with the help of librarians, educators, and the community around them through neighborhood and community-based reading groups. Adults can also engage in their own time with forums of reading that take place online, as well as listening to podcasts about reading and listening to discussions of books, as suggested by some survey respondents, to still feel a sense of community by discussing books online.

Based on these findings, this study recommends community-driven initiatives led by librarians, educators, campus organizations, or anyone who is invested in the promotion of adult literacy. Potential strategies include campus or public library book clubs that consist of adult readers, such as a creation of "take home" reading kits with access to free or low-cost literary texts or the organization of a month-long reading challenges with incentives to promote reading habits. Further strategies include workshops focused on time management and digital literacy. Organizations supporting nontraditional and adult students may find these approaches especially beneficial, as these populations often balance academic, professional, and family responsibilities.

A final recommendation draws from Carillo's Securing a Place for Reading in Composition. Carillo's study promotes becoming a "mindful reader" and encourages reflection and deliberation when reading to remain present. Following Carillo's suggestions could help redirect adult readers to a new and enriching way to approach reading. Educators and librarians can encourage mindful reading with guided reading questions to think about after reading, prompts to journal about, or group discussions to find a personal connection to the literature that others connect with as well.

These recommendations emphasize that improving adult reading practices is most effective when approached collaboratively, intentionally, and with community-driven support. Professionals such as educators and librarians are at a unique advantage to help foster these environments where reading is sustainable and deeply engaging. Through creativity, commitment, community, and collaboration, the reading obstacles adults face can be addressed, allowing them to reconnect with literature and integrate reading into their daily lives as a meaningful task.

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Agency to Autophagy: Exploring the Representation of Eating Disorders in *Swallow* and *In My Skin*

Brittney Norton

ABSTRACT

Disordered eating has become a common trope in film, television, and literature, and it is often associated with the horror genre. Both Marina de Van's *In My Skin* (2002) and Carlo Mirabella-Davis's *Swallow* (2019) explore eating disorders characterized by a lack of personal agency and control. Although these films' female protagonists react to their respective situations in differing ways, the films offer viewers a vicarious experience immersed in the symbology of disordered eating. Employing scholarship from a variety of fields, including film studies, eating disorder research, and body horror theory, this study addresses the phenomenon as represented in both films. The behaviors of Esther in *In My Skin* demonstrate an experience of bodily mutilation deeply connected to that of those suffering from eating disorders; those of Hunter in *Swallow* display similar elements, though differences abound in her "style" of disordered eating. Ultimately, lack of agency and control are the catalysts for the characters' bouts of disordered eating, as evidenced through their careers (or lack thereof), their male relationships, and their female relationships. These elements reveal that lack of bodily awareness and disassociation, particularly in moments of consumption, can lead to disordered eating behaviors.

The horror genre in film abounds in themes and motifs surrounding *embodiment*, a component often dubbed "body horror." The recent films *In My Skin* and *Swallow* contribute to the body horror subgenre in their complex representations of disordered eating. *In My Skin* follows Esther, a young woman blossoming in her career who appears happy, fulfilled, and engaged in meaningful relationships. But when she injures her leg, she falls into a disturbing pattern of self-mutilation and *autocannibalism*. Consequently, she must face her addictions or give in to them completely. *Swallow* presents Hunter, a newly-pregnant young woman married to an exceedingly wealthy executive. Control of her life is consumed by the opinions of her husband and in-laws, leading Hunter to develop an eating disorder that drives her to eat unusual, inedible objects. Events decline rapidly, and Hunter is faced with the decision of whether to give in to her family or claim control over her own life.

Both Esther and Hunter demonstrate patterns of disordered eating. While Hunter is medically diagnosed with *pica* (PIE-kuh), Esther manages to fly under the medical radar despite her obvious struggles, only undergoing medical care for her initial leg injury, a pre-mutilation following the wreck of her car. While Esther's and Hunter's ages are not specifically given, one can assume that Esther is in her thirties, Hunter in her late twenties or early thirties. Each is white and presumably straight, with a male partner—conventional media portrayals. Hunter is given the clear diagnosis of pica, thus "eating items that are not typically thought of as food and that do not contain significant nutritional value, such as hair, dirt, and paint chips" (NEDA). Pica commonly affects pregnant women (Cleveland Clinic). Esther's behavioral patterns are more nuanced and leave room for interpretation, yet some of Esther's actions can fit into the category of binge eating disorder. Zoaib Tharwani defines binge eating disorder as "persistent episodes of uncontrollable consumption of oddly heavy quantities of food in a short span, typically followed by remorse, shame, and emotional distress" that are "related to [bulimia nervosa] as a maladaptive behavior," with characteristics "frequently displayed as a result of starvation, impulsiveness, and cue learning, along with a result of harmful episodes involving periods of starvation followed by binge eating" (1). Esther, as seen in the hotel room scene, indulges in large quantities of flesh rapidly, in a single sitting, a loss of personal agency stemming from a mind-body disconnection at an uncomfortable business dinner.

Binge eating disorder is characterized by overeating, clinically defined as "the consumption of a substantial quantity of food rapidly while feeling uncontrollable"; typically the person engaged in the eating is left feeling disgusted and shameful after the over-indulging (Tharwani 2). Curiously, neither Esther and Hunter appears to feel these emotions. Each seems to portray a serenity at finally giving in to the urges. This variety of binge eating, when coupled with "inappropriate methods of making up for the extra calories consumed [,] is the hallmark of [bulimia nervosa]" Tharwani 2). While Hunter is seen vomiting on occasion, she never attempts to reverse digestion of what she has consumed. In fact, the object of consumption returns after her refusal to eat it. Tharwani explains that these forms of eating disorders are heavily associated with depression, self-hatred, anxiety, and guilt, all of which can present as comorbid with self-destructive behaviors, as evidenced by Esther's and Hunter's actions (3).

Steve Macfarlane, in a 2002 interview, posed an intriguing question to De Van. "When I first saw *Dans ma peau*," he asked, "I wondered if it wasn't a metaphor for drug addiction, or—as some have theorized—anorexia?" De Van vehemently retorted:

> It's not a metaphor. It's my story…I insisted on the feeling surrounding self-mutilation, which is feeling like your body doesn't belong to you…. So explaining the movie, my thesis was: a woman feels her body is not her own, and the only way she knows how to reconnect is through pain. It was not an act of destruction or hate. It was a way to feel that you are whole, and that you are alive.

De Van herself has noted her film is not a metaphorical representation of either drug addiction nor anorexia. Yet much scholarship for the film's use of *cinéma du corps* hinges on its impact on the spectator. De Van did indeed experience bodily mutilation. She personally dealt with self-harm as depicted in the film. Carlo Mirabella-Davis used a similarly personal approach. In an interview with Jez Stoker, Mirabella-Davis explained:

> Swallow was inspired by the life of my grandmother, a homemaker in the 1950s in an unhappy marriage who developed various rituals of control… she was looking for order in a life she felt increasingly powerless in. My grandfather…put her into a mental institution where she was given electroshock therapy, insulin shock therapy (the inducement of medical comas), and a non-consensual bilateral lobotomy… I always felt there was something punitive about the way my grandmother was treated, that she was being punished for not living up to society's expectations of what they felt a wife or a mother should be. (Borrowing Tape)

Both De Van and Mirabella-Davis wrote and directed deeply personal films, taking big hits financially to stay true to their stories. Tales of such a personal nature are sure to have a strong effect on viewers, especially if a viewer can relate experiences of their own, finding resonance in the film's impact.

Tim Palmer argues that the ultimate significance of *cinéma du corps* is the broad impact it has on the spectator. He posits that the impact does not need to be disturbing, as is often assumed, and that the spectator is rather a "profoundly active participant" (179). Palmer further examines the idea that, while other *cinéma du corps* films highlight violence between characters, De Van embodies "corporeal malaise through self-mutilation" (175). Similarly, Angela Failler explains that to observe these scenes is to get "glimpses into a rather private suffering," and more specifically, that they "operate to inform the spectator's understanding of self-harm in the absence of other kinds of encounters" (12).

Failler's main argument is that the spectator must move past "dominant readings of self-harm that view it as destructive behavior with solely negative consequences" and understand that "for those who practice it, self-harm serves as a means of survival"—an argument that holds true for both *In My Skin* and *Swallow* (12). Failler posits that such self-harm serves as a means of self-protection—something both Esther and Hunter desperately try to achieve as their agency and sense of control slips away. Failler explains that "mediatized accounts" of self-harm allow viewers the chance to consider a relationship between self-harm and the spectator, a key consideration between the two films. Scholar Greg Hainge further explores the relationship between film and viewer by establishing that both flesh and wounds are seen through the character's physical representation as well as the image as seen by the audience through their own metaphorical understanding (567).

Eating disorders often are manifested through emotional distress and traumatic events, each of which are evinced by Esther and Hunter. Carina Stopenskti posits that within body horror, female protagonists create a "dichotomous space of both feminism and anti-feminism, agency and oppression" and that, through this space, the "female mutilator [can] actualize her identity" (1). I argue that Esther and Hunter employ this concept through disordered eating, to actualize their identities and gain a sense of control over their lives when they feel that control is slipping away (metaphorically for Esther, situationally for Hunter). The attempt to gain control is a hallmark cause of burgeoning eating disorders. Stopenski points out that the "erotic feminine grotesque" is "particularly jarring" (7). This concept is most applicable to De Van's film, as Esther consumes herself in a deeply sensuous, even sexual, manner in the hotel scene, and heavier still in the final scenes as she documents her mutilation process. She behaves in ways considered traditionally feminine while simultaneously mutilating herself in an extreme, disturbing manner.

If Esther's femininity and disconcerting behavior are dichotomous, landing at extreme ends of the spectrum, Hunter's behaviors are more nuanced. Hunter maintains a traditionally "feminine" daintiness. She is not working as a career woman in a "boy's club," and she maintains a home for her husband. While Esther takes aggressive, animalistic bites from her flesh, Hunter, maintaining her dainty self-conception, consumes small objects individually. She suffers as a traditional housewife is expected to suffer: in silence. Her attempts to exert control remain quiet and internal, while Esther's attempts are loud and external. Both women centralize their femininity, albeit in different ways. Stopenski argues that "the female mutilator is a feminist icon in her own right" as she recognizes her mistreatment, or lack of control, and takes steps, good or bad, to rectify the situation (16).

Researchers have found a "close connection between dysregulated dopamine levels and the symptoms of eating disorders," indicating that, to Esther's and Hunter's brains, their behaviors are self-protecting, possibly even saving them from their lack of control (Tharwani 7). When asked why she has eaten such dangerous objects, Hunter replies, "It made me feel in control." This feeling of control allows Hunter to activate her agency and remove herself from the abusive situation; for Esther, viewers are not offered a resolution.

To examine the notion of control further, it is important to consider the male relationships and interactions that Esther and Hunter experience. Carrie Tarr posits that this kind of behavior can be an argument for "woman's response to the patriarchal world around her" (70) and that a self-mutilating woman can be seen as a "form of rebellion against the constraints of...patriarchal society" (71). This juxtaposition forces the viewer to ask if this action is a "bold and necessary act of female defiance" or a sign that a woman's mental health has plummeted to unknown depths. The men surrounding Esther and Hunter are, I argue, the highest form of control-reduction for the two women. Esther experiences lack of control in her career sphere as she is groped by her boss while seeking a promotion, and upon receiving that promotion is thrown into a pool, fully clothed, by a group of her male colleagues—arguably a metaphorical rape scene. Once she is established in a new role, Esther faces backlash from her male boss after struggling through an awkward client dinner. Esther's boyfriend, Vincent, cannot handle Esther's emotions; he shuts down and does not supply her with any assistance, even when he knows she is struggling.

Hunter, too, faces extreme issues with the men in her life in the domestic sphere. Her stability lies entirely in the financial resources of her husband and father-in-law, which leaves her with few options. As her situation begins to spiral, and her struggle with pica hospitalizes her for the second time, both her in-laws and Ritchie, her husband, tell her that (rather than ask her if) she will be going to an in-patient care facility. Her father-in-law declares, "if she won't go, Richie wants a divorce." Her father-in-law is even present, alongside Ritchie, at Hunter's first psychiatry appointment. While clearly under the thumb of his father, Ritchie is still guilty in his poor treatment of Hunter. He shares with many of his colleagues that Hunter is struggling with disordered eating, and when confronted by an upset Hunter, he cruelly exclaims, "Can you please not ruin my birthday?" as if Hunter is the one at fault for the discomfort at the party. Certainly Hunter, even before marrying into such a sadistic family, has already had a trauma involving an abusive man, considering that her biological father raped her mother—an act resulting in Hunter's birth. And one cannot discuss the male relationships without bringing up the caveat of Louis. While viewers may find him initially off-putting, he is the reason Hunter is able to escape. One could argue of Louis's role that a male savior was necessary for Hunter's escape.

Tarr asserts that a "disaffected heroine" will "actively (and violently) reject the male-ordered social world" (78), and when viewing these films through the lens of a male-ordered social world, one must also consider the way relationships between women function in these films. For Esther, there are two main women with whom she interacts: Sandrine and the female client. The female client represents an extension of the male-centered career sphere, and while she may be intended to serve as a gap between the two represented genders, she does not meet Esther on any womanly level and remains stoically business-oriented. Sandrine, while serving as a traditional female friend, does not offer Esther necessary support as Esther's disordered patterns continue to blossom. She is jealous of Esther, particularly for things that have a focus in a male-oriented sphere, such as her career and the attention she receives from the men around her. Sandrine even ignores Esther's pleas for help when their colleagues throw Esther in the pool.

While Esther's self-mutilation is more visually apparent than Hunter's, it is Hunter's lack of agency in her relationships that are most disturbingly, painfully obvious. Hunter's mother has relegated her to a "less-than child" due to the trauma of her conception, and as such, Hunter experiencing this loss of agency very early on. With her mother-in-law, Hunter faces constant scrutiny on her daily activities, her appearance, and her finances. She tells Hunter that "Richie likes his girls with long hair" and suggests Hunter change her appearance. She also makes insulting remarks regarding Hunter's career choices and lack of financial stability. In one of the biggest betrayals, Hunter learns that her psychiatrist is working directly with Ritchie and his family behind her back, revealing confidential information. As soon as Hunter has finally created a stable and beneficial connection to another woman, the rug is cruelly pulled from beneath her. Much like Sandrine and the business client, the women in Hunter's life operate as cogs in the machine of a male-centered world, and both Hunter and Esther are continually chewed up.

With an understanding of the relationships that remove agency from both women, one can consider the mind-body divide, and how such a divide creates an avenue for disordered eating. The opening scenes to both films immediately inform the viewers of the cognitive separation occur. In My Skin showcases staunchly juxtaposed images of office spaces and cityscapes in a split-screen format that feel jumpy and disjointed, appearing inverted or negative. Swallow takes an approach that can leave the viewer with whiplash. The opening scene is serene, clean, crisp, and beautiful—a morning of slow chores and getting dressed in fine clothes. The scene changes to a hay-bedded barn where a lamb is slaughtered, rapidly diverging into scenes depicting blood and raw meat. Both opening scenes evoke a disjointed experience that will be replicated through the disconnection between mind and body in Esther and Hunter, which leads to disordered eating.

Both films highlight painfully awkward dinner scenes in which Esther and Hunter respectively lapse into unusual trances, accentuating their separation from their physical condition as they feel unheard and invalidated by their dinner companions. Both women experience these trance-like states—Esther at her plate of food and Hunter at her ice water—until they submit to their impulsive yearnings. Hunter aggressively grabs a chunk of ice and aggressively chews, while Esther, experiencing the loss of a phantom limb, stabs and slices at her own arm under cover of the table. All other parties are uncomfortably aware that an odd moment is transpiring for the women, but none speaks on it or even acknowledges it. At this point in the respective films, Esther has already been yielding to these urges, while Hunter experiences this uncanny urge for the first time.

In a triggering situation, an increase of tension leading to a momentary and severe form of mind-body disconnect in the disordered eater can result in rash decisions and impulsive behavior. Esther experiences this disconnection as she sits at the table. While she experiences a "normal" level of mind-body disconnect throughout the course of the film, there are three moments that specifically enter the heightened state that leads Esther into disturbing scenes: the aforementioned dinner scene, the hotel scene, and the photography scene. As with binge eating disorder, Esther is full to bursting with the urge to act on her addictions, and when she finally gives in, she experiences a sexual, nearly euphoric sense of relief in finally surrendering. These acts leave her once again entranced as she comes down from the high of the surrender.

Much like the medical diagnosis of pica for Hunter, Swallow verbally addresses the mind-body divide experienced by Hunter. As her mother-in-law teaches Hunter how to process produce in a juicer, she informs Hunter that her struggle with pica is simply a disconnection between her mind and her body and that, upon re-establishing the mind-body connection, her woes will cease. The use of a specific food as a means to directly solve an eating disorder is a common behavior for sufferers; however, as seen in the movie, this is never at the behest of a medical professional and proliferates solely in eating disorder circles.

Often those suffering from eating disorders fail to understand the true damage they are doing to their bodies, lost in a dreamscape of rectifying their perceived problems while lacking awareness of the problems they are in turn creating, Both Esther and Hunter fall into this mental trap. Esther, in an attempt to reclaim her bodily autonomy, fails to feel any sensation of pain while she stabs and chews; both the doctor and Vincent comment on her lack of response to a problematic injury. After her initial leg injury, Esther suggests going out for drinks instead of getting medical attention quickly. As Kath Dooley observes regarding Esther's lack of pain:

> One could view Esther's problem as representative of a mind/body divide: required to be 'all mind' in the corporate world, she lacks the ability to feel the pain of her serious and graphically presented wound as her body is literally disconnected from her brain. Her body's nerve centre, one that registers and processes such sensations, has broken down. According to this reading of the film, the narrative involves a drive to overcome this problem and reconcile Esther's position as both object (body) and subject (mind). (59)

Dooley's argument equally applies to Hunter, who is convinced that she has her struggle with pica under control while consuming objects including a thumb tack, a jack, and even a battery. When her therapist addresses the dangers of swallowing a battery, Hunter is unfazed. The troublesome pattern continues even further when, emotionally pushed to the brink, she attempts to consume a small screwdriver. Like the three heightened scenes involving Esther, this scene represents Hunter's climactic submission to her self-destructive urges. Unfortunately for Hunter, this action does not bring about a rush of relief, but sends her to the hospital, in a dire state. Such is the case, sadly, for many suffering from eating disorders.

Through large- and small-scale life events, women are stripped of control and personal agency, which can ultimately lead them to deal with their emotional distress through patterns of disordered eating. Esther's career sphere, Hunter's domestic sphere, and their relationships with both men and women who work in the male-centered world are the catalysts that drive these women to the edge and leave them searching for an avenue of relief and a way to gain a sense of control. Both women begin this process by acting out in ways that allow them to stay grounded, albeit problematically. Esther maims only non-visible portions of her body, and Hunter begins with small, unobtrusive items such as marbles. As the addiction of each character grows, their need to feed it becomes stronger. To them, this need is not simply an act of addiction, but representative of the change they deeply desire to see in their lives. By the end of the films, neither woman has a concrete plan, and both have escaped into new, unknown realms. These ending scenes are highly representative of the outcomes that those with eating disorders face. In Hunter's case, she removes herself from the violent and horrifying Ritchie and his family, escapes to a hotel room and "cleanses" herself, both mentally and physically, by confronting her biological father and by aborting the fetus. The viewer is left to assume that Hunter will be okay and will move on to better things. Esther chooses to take a different path. Although she removes herself from Vincent and her career, she leans more heavily into self-mutilation, and the viewer is left to question whether Esther will pull through—or if she will succumb, once again, to her maddening addiction.

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Understanding the Societal, Disciplinary, and Phenotypic Factors Contributing to Hindered Diagnosis of Autism in Women

Emmalee Chance

ABSTRACT

This systematic literature review investigates the possible factors contributing to the underdiagnosis of autism spectrum disorder (ASD) in women, focusing on three key areas: social masking, gender bias in ASD screening tools, and the unique female phenotype of ASD. By analyzing existing literature from the James E. Walker Library JEWL Search provided by Middle Tennessee State University, I researched how social masking allows women to hide their symptoms, leading to misdiagnosis or late diagnosis. Additionally, I explored how traditional screening tools may be biased toward male presentations of ASD, further complicating accurate diagnosis. The last analyzed topic regards how a possibly unknown and under researched presentation of ASD in females could affect diagnostic probabilities. In summary, research highlights the urgent need for more research on the misrepresentation of ASD diagnosis in women. Though findings were limited and inconsistent, understanding these challenges is crucial for developing effective diagnostic criteria and intervention strategies that carefully consider the distinct presentations of autism in females, promoting improved mental health support and outcomes.

Autism spectrum disorder (ASD) is a neurodevelopmental disorder indicated by obstacles with social communication and interaction, restricted and repetitive behaviors, and sensory integration (American Psychiatric Association, 2022). The condition develops during childhood and lasts throughout one's lifetime (DiRienzo et al., 2023). In America, approximately 1 in 36 kids (Amoakohene et al., 2023) and 1 in 41 adults (Dietz et al., 2020) are diagnosed with autism spectrum disorder each year, and the numbers seem to be increasing. However, there is no clear answer yet as to why (Aylward et al., 2023). Although around 2% of the population is diagnosed with ASD, males are significantly more likely to receive a diagnosis than females and tend to be diagnosed earlier in life (Belcher et al., 2023). In fact, males are two to five times more likely to receive a diagnosis of ASD compared to females (Bishop et al., 2020). The reasons for gender disparity in ASD diagnosis are unclear, but there are many theories. One theory is the presence of a biological sex difference that could explain why more males are diagnosed with ASD. However, a more popular viewpoint is that males and females have an equal likelihood of having ASD, but females experience hindered diagnosis due to camouflaging symptoms, gender-biased screening instruments, varying ASD symptoms, and possibly a combination of these determinants.

The first possible answer to why females are less likely to get diagnosed with ASD is that females are more likely to camouflage their symptoms. Camouflaging is used as a coping mechanism that involves concealing actions or manners associated with ASD, or more specifically, "using explicit techniques to appear socially competent" (Allison et al., 2017b, para 1). In places where the disorder is typically identified in children, such as in the classroom, camouflaging can be a coping mechanism for the person masking their ASD symptoms in the sense that they might feel like they fit in with others more. However, camouflaging also prevents teachers and clinicians from being able to distinguish ASD and work towards early intervention, leading to poorer long-term outcomes for females with ASD (Dean et al., 2017).

The next possible explanation for why females with ASD are overlooked in diagnosis is due to diagnostic screening tools that are possibly biased in favor of males with autism spectrum disorder. Though there is little research on this idea, questions have surfaced about whether the expected male preponderance in ASD has affected what gender-specific symptoms and behaviors clinicians look for in tests (Allison et al., 2017a). This bias can emerge if the screening tools are not gender sensitive, making the instruments questionable in terms of being used for females with autism. For example, many autism diagnostic tools are based on behaviors more commonly observed in males, such as overt social difficulties and restricted interests like an intense focus on objects or patterns. However, females with autism might display more subtle social challenges, or their restricted interests might align more closely with socially acceptable activities like reading or collecting items. If these gender differences are not accounted for, females may be underdiagnosed or misdiagnosed (Kopp & Gillberg, 2011).

One other theory that could explain why females go undiagnosed, misdiagnosed, or have a delayed diagnosis is that there is not enough research on the female phenotype for autism spectrum disorder. Studies, though scarce, have shown that there are sex differences in the behavioral manifestation of ASD symptoms between males and females with ASD, but there is little evidence of whether these differences are specific to the disorder (Bishop et al., 2020; Demetriou et al., 2021). In particular, females with ASD demonstrated higher cognitive performance, although it is not yet proven that this might not also be the case for neurotypical females (Demetriou et al., 2021). Variable aspects of cognitive performance include adaptive behavior, social participation, restrictive and repetitive behaviors (Bishop et al., 2020), verbal learning, memory, and information processing speeds. These variations in cognitive abilities can complicate ASD diagnoses, as they may lead to some individuals being misdiagnosed or overlooked entirely if the diagnostic criteria do not account for this wide range of cognitive functioning (Demetriou et al., 2021).

Though there is still insufficient research to answer why women and young girls with ASD are more likely to receive a delayed diagnosis or no diagnosis at all, the issue is vital to bring awareness to because of the consequences of not being knowledgeable. These consequences could include abnormal levels of anxiety and/or depression for young and adult females without an accurate diagnosis of ASD (Allison et al., 2017b; Haney, 2016). In addition, a delayed diagnosis can prevent some from receiving early intervention, typically as a child, which has been shown to greatly benefit those with ASD when living a normal life (Haney, 2016). A more thorough understanding of the factors that may lead to misdiagnoses – including social masking, bias in diagnostic tools, and phenotypic variation – could help prevent these poor outcomes.

Methods

Sample of Studies and Inclusion Criteria

Academic sources for this systematic literature review were found using the James E. Walker Library JEWL Search provided by Middle Tennessee State University. The first search in the database was titled "hindered diagnosis in ASD," and there were 50,571 articles. To determine which articles to analyze further, several inclusion criteria were applied. First, only peer-reviewed academic journals were considered to maintain credibility. Second, all the sources were required to be written in English to ensure accessibility. Third, to prioritize recent, relevant, and up-to-date articles, searches were restricted to publication dates ranging from 2000 to 2024 (when the search was conducted). Finally, the included articles only focused on comparing biological males and females, or cismen and ciswomen, due to a lack of research on autism diagnosis in trans and nonbinary individuals. Participants of any age were considered. After assessing these criteria, a total of 12,259 sources were excluded. Next, advanced searches were conducted for each potential explanation – social masking, bias in diagnostic tools, and phenotypic variation. To determine which articles were relevant to each topic, the titles and abstracts were reviewed. Specific search terms for each topic are described below. Figure 1 displays the search process and the number of articles included and excluded at each stage of the literature review.

Social Masking

For specificity on the tendency for girls to camouflage their symptoms, the following search phrase was used in the JEWL Search: [((hindered diagnosis in ASD)) AND ((women) OR (female) OR (woman) OR (females)) AND ((autism) OR (ASD) OR (autism spectrum disorder)) AND ((social masking)) NOT ((face masks) AND (facemasks) OR (face covering)) OR ((female phenotype autism)) AND ((mood disorders) or (depression) or (bipolar) or (anxiety)) OR ((gender bias in autism diagnosis))]. A total of 45 academic sources written in English surfaced with this search. Of these articles, 31 were deemed irrelevant, based on the title and abstract. Therefore, a total of 14 sources were included in this review (see Table 1).

Gender Bias in Screening Tools

To locate articles dealing with the issue of gender-biased diagnostic tools, the advanced JEWL search included the following phrases: [(gender bias in Autism screening tools)] AND [(sex discrimination)] OR [(autism diagnostic tools)]. A total of 335 sources were identified, and scholarly journals published in or after 2000 were the only materials considered for this analysis. After applying these limiters, a total of 91 sources remained. When adding the phrase [(AND gender)] to JEWL Search, only ten articles appeared, and none were helpful. After removing that phrase and choosing the subjects "autism," "diagnosis of autism," "screening," "questionnaires," and "diagnostic assessment," 10 articles surfaced, and all 10 of them seemed to be related to racial discrimination. As a result, I changed the phrases in my search altogether to [(gender bias in Autism screening tools)] AND [(women) OR (female) OR (woman) OR (females)]. I also checked the subject "gender bias" and found 353 articles. Out of the 353 articles, 90 were about gender bias; of these, 10 sources qualified based on an examination of the title and abstract (see Table 2).

The Female Phenotype

The first search in the advanced JEWL search for this topic was phrased as [(female phenotype in autism spectrum disorder)] OR [(female phenotype theory)] AND [(autism) OR (ASD) OR (autism spectrum disorder) OR (Asperger's) OR (Asperger's syndrome) OR (autistic disorder) OR (Aspergers)] OR [(Sex differences in ASD)], which yielded 843 potential sources. Then, the following subjects were selected: "Sex differences," "female," and "autism spectrum disorder." After applying the decided subjects, 36 peer-reviewed studies remained, and 14 sources were relevant for this project (see Table 3).

Figure 1. JEWL Search Methods

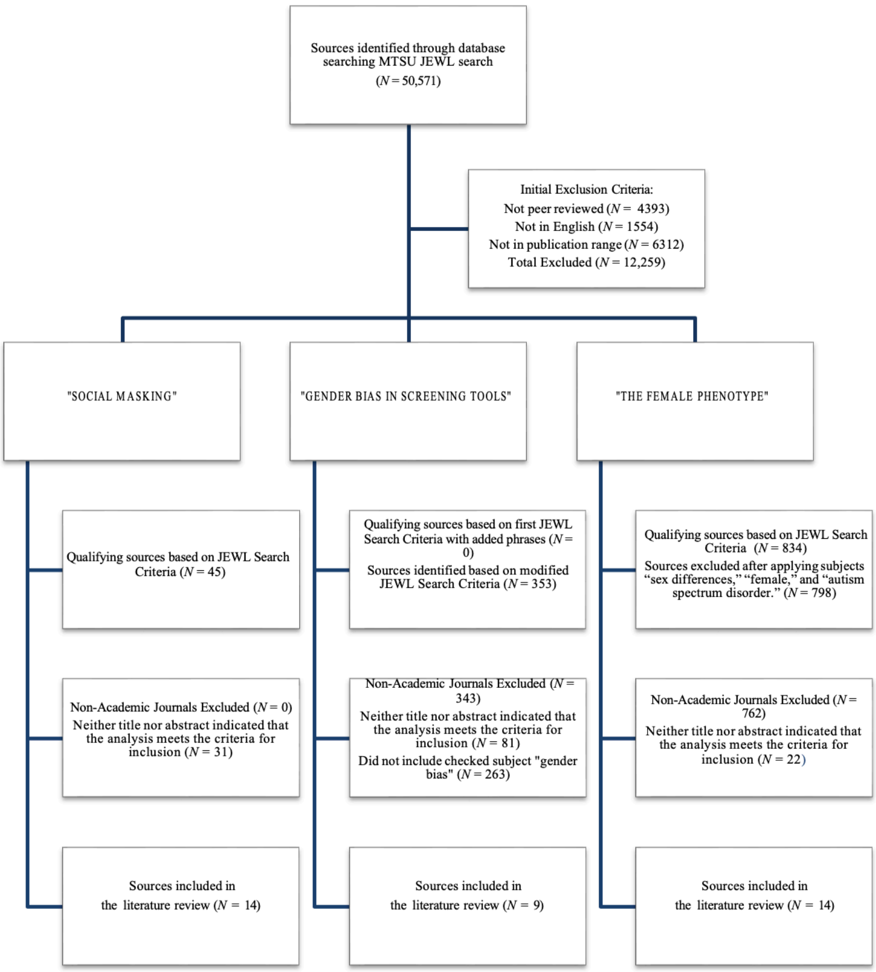

Table 1. Sources on Social Masking

Study	*n*	Age of Diagnosis (Years)	Research Design and Analysis	Main Themes	Country/Nationality/ Race	Sex differences	Limitations
(Allison et al., 2017b)	(92) 3 excluded; *n* = 89	16+	Thematic analysis	Motivation: "I Want to Know and Be Known" Consequences: "I'm Not My True Self"	55% British; 15 nationalities	can only speculate differences in attitudes	only demonstrates ASD in adults (m & f)
(Anderson et al., 2023)	12 (qualitative studies); number of participants not recorded	N/A; age at time of study = 18+	Systematic literature review	"I tend to fall between the cracks," ""The hidden hurt," "Having to meet the expectations of others"	N/A	"increased risks of exploitation for autistic women" "detrimental influences on psychological wellbeing for autistic women"	did not account for adolescents with ASD; did not compare or focus on males; ethnicities not reported
(Burns et al., 2016)	10 f with ASD (15 not recruited)	4-15	Interpretative phenomenological analysis (IPA)	"Overcoming challengs," "Desire for freindships," "Experiences of Social Environment"	NA	most females were motivated to have friendships; with rejection, they began masking	Only includes females with diagnosis based on "male-based criteria"; males were not compared
(Baren-Cohen et al., 2021)	277 (206 diagnosed; 78 females & 128 males)	$\bar{x}$ = 12-14	thematic analysis	Motivations: Lack of awareness and acceptance of ASD; "dangers of camouflaging," "positive aspects of camouflaging"	N/A	SD of ASD females' camouflaging scores were higher than males with ASD	Not all participants were diagnosed, but self-identifying; survey only available online (also a strength)
(Cage & Troxell-Whitman, 2019)	262 (135 females, 111 males, 12 other gender identities)	*>18*; $\bar{x}$ = 33.62	cross-sectional survey	"Fitting in and passing in a neurotypical world;" "Avoiding retaliation and bullying by others;" "Internalised stigma"	N/A	both male and female participants rated conventional reasons for camouflaging more highly tan relational reasons; females endorced conventional reasons more than males	ethnic diversity and education level not accounted for; only represented highly verbal individuals; not generalizable
(Clarke et al., 2021)	24; 8 triads (girl/parent/educator)	7-12	Thematic analysis	4 themes (look at figure 2)	7 white british; 1 white european	women and girls vulnerale to camouflaging and having negative impacts	small sample; only includes autistic girls
(Cook et al., 2021)	29 (studies reviewed); N = 2254 (Participants across all studies)	$\bar{x}$ = 7 (adult studies used in calculations); $\bar{x}$ = 32.98 (adult studies)	systematic review	Inconsistent results	86.1% white	Out of the 9 studies on sex differences, 7 reported females/identifying girls had increased rates of camouflaging through adolescence	samples differed on key dempgraphics like sex and gender, IQ, and age of diagnosis
(Cook et al., 2024)	133 autistic individuals	3-68	thematic analysis	"embracing diverse communication styles, interests and perspectives," "creating a more inclusive mixed-neurotype social environment together," "minimising and managing mixed-neurotype miscommunication in mutually beneficial ways," "enjoyable interactions involving reduced anxiety and exhaustion as well as genuine connection and rapport"	62.4% white	Sex/gender not considered	sample was mostly white, educated individuals who recieved ASD diagnosis late in life; not generalizable
(Dean et al., 2017)	96 (24 m with ASD, 24 f with ASD, 24 m w/out ASD, 24 f w/out ASD)	(M) $\bar{x}$ = 7.71 (F) $\bar{x}$ = 7.75	ANOVA	Measurement of "Game," "Engagement with Peers," and "Solitary"	NA (assumed all American)	Look at Table 4 (Found significant between-group differences); Girls with ASD have social experiences that differ from those of boys with ASD.	size and duration of study was small
(Field et al., 2024)	13 studies	NA	meta-ethnography of 13 qualitative studies	'It's a defence mechanism really," unintended consequences, "No harm done in my opinion"	NA	Sex/gender not considered	Sex/gender, diverse backgrounds, not considered; sex differences not considered
(Hull et al., 2020)	592 (Participants reported ASD diagnosis: n = 278) (Participants did not report ASD diagnosis: *n* = 230)	N/A; age at time of study: $\bar{x}$ = 36.8	power analysis	suggestions that camouflaging might be driven by situational pressures, such as stigma or individual differences	N/A	"Camouflaging was negatively related to extraversion, agreeableness, and conscientiousness, while it was positively related to neuroticism"	study conducted online, so participants' diagnoses were not verified, but all participants were required to share healthcare provider that diagnosed them
(Jorgenson et al., 2020)	140 (Males w ASD: *n* = 55; Females w ASD: *n* = 23) (Males without ASD: *n* = 27; Females without ASD *n* = 35)	N/A; age at time of study = 13-18	ANOVA and MANOVA	Differences in camouflaging by age and developmental stage;	N/A	When age was not accounted for, TD females and ASD females had more similar CAT-Q scores than males. When age was accounted for, there were no significant sex differences.	smaller samples could affect results, whether age was accounted for or not; no demographic data collected
(Raz & Schneid, 2020)	24 (2 were self diagnosed)	N/A; age at time of study = 16-55 (Mean = 31)	Qualitative analysis	"Passing as normal," "What is wrong with me?"	All Israeli	Sex/gender not considered	intellectual ability not measured, small samples

Table 2. Sources on Gender Bias in Screening Tools

Study	*n*	Age of Diagnosis (Years)	Research Design and Analysis	Key Findings	Country/Nationality/Race	Limitations	Bias Found?
(Allison et al., 2017)	557 females, 680 males	N/A; age at time of study: $\bar{x}$ = 35.02	parallel analysis	No substantial biases were found in the AQ-10	majority White European	Participants were not randomly selected	no
(Atherton et al., 2023)	300 (149 male, 151 female)	*(18 to 72 , $\bar{x}$ = 26.79)*	Implicit Association Test	"A significant implicit gender bias towards associating males with autistic traits was found using the IAT."	81.27% White, 2.22% Black or African American, 12.70% Asian, and 3.81% Other	included an online sample; could be argud the study was based on "male-biased" ASD traits	yes
(Auyeung et al., 2019)	1,237 with a clinical diagnosis, 7,356 controls	N/A; age at time of study: $\bar{x}$ = 33.34	parallel analysis	No substantial biases were found in the AQ-10 [Replication of study by Murray et al. (2017)]; Results showed males having higher levels of ASD traits than females.	NA	Important depomgraphics not included: ethnicity, class, education level	no
(Belcher et al., 2023)	5246 women, 1830 men	N/A; age at time of study: $\bar{x}$ = 32.22	survey	women had a higher probability of endorsing items relating to social skills and communication	UK	ethnicity was not accounted for; not generalizable	yes
(Gross et al., 2022)	6269 children	Age at time of study = 1.7-17.9	observational study	Findings were inconsistent; "hand mannerisms item demonstrated consistent bias across ADOS-2 modules among female children compared with male children;" females found this item more difficult	1619 Black/African American , 3151 White	lack on info on ethnicity; samples too small to meansure bias in other ethnic groups	Yes, but magnitude of bias is small
(Kopp & Gillberg, 2011)	191	6-16 at time of study	correlation	most items were non-significant except the following: "lacks best friend" was high in ASD male group; more rated symptoms in girls were "has a different voice/speech," "avoids demands,"	N/A	small sample from a referred clinic; parental biases to be considered	Predicted with nature of questions, but not tested
(Lonergan, 2021)	7 (results data from 7 diagnostic tools)	NA	systematic review	"low representation of females in validity samples of tools"	UK	more research is needed	Yes
(Noble et al., 2014)	145 (94% with ASD, 6% with other developmental disorder)	N/A; age at time of study: $\bar{x}$ = 2.34 (all under 36 months)	diagnostic assessment analysis	14% of ASD participants passed the screening test ; 74% were accurately classified; 86% of ASD children were accurately classified as at-risk	N/A	limited demographic info	Yes, but not direclty with gender; could be applied to gender with further research

Study	*N*	Age of Diagnosis (Years)	Research Design and Analysis	Main Themes	Country/Nationality/Race	Sex differences	Limitations	
(Abbo et al., 2022)	81 Females, 156 Males	Males, $\bar{x}$ = 6.6; Females $\bar{x}$ = 7.8	Statistical analysis	NA	Uganda	females received later diagnosis than males in Uganda	missing data on sex, age of diagnosis, and diagnosis	
(Bargiela et al., 2016)	14 women	15+ (18-35 during the study) precise ages not given to protect confidentiallity	Semi-structured interview	Pretending to be normal; "You're not autistic;" Forging an Identity as a Woman with ASD	UK	Only women are discussed	1st study to focus on late-daignosed women with ASD (to their knowledge and my own)	
(Bishop et al., 2020)	76 females, 471 males	N/A; age at time of study: 14-21	independent sample t tests	teachers and parents reported little differences in social interaction between sexes	45% Non-White and/or Hispanic	standardized scores showed females with ASD being more behaviorally divergent; no signifcant differences	potential biases in parent and teacher reportings; cannot generalise findings	
(Boan et al., 2020)	480	N/A; age at time of study: 18-72 months	quantitative design	significant sex differences in social communication	White 79%, Black 15%, Other 6%, Hispanic ethnicity 5%	girls had bigger social communication deficits than boys, but differences varied by age; no signicant sex differences in RRBs	reliance on clinical samples, potential bias in parent-reported data; lack of diversity	
(Castrén et al., 2023)	79 studies; Girls/women with only ASD 3131, Boys/men with only ASD 7419, Girls/women with ASD with ID 1253, Boys/men with ASD with ID 2955	N/A; age at time of study: $\bar{x}$ = 8-15	meta-analysis	behavior differences and symptom presentation with vs without ID	NA	girls with ASD and ID showed more severe social and repetitive behavior challenges, and poorer language and motor skills than boys	reliance on previously publsihed data	**ID = intellectual disability
(Chakraborti et al., 2020)	215 ASD cases	NA	correlation	sex-specific biological differences in how serotonin and 5-HIAA influence brain development and function	NA	males had higher levels of serotonin and 5-HIAA in the blood; females displayed more severe ASD behaviors	age not clarified; low sample size	**5-HIAA is a metabolite for serotonin
(Demetriou et al., 2021)	45 males 34 females	N/A; age at time of study: 8-18	comparative design	females showed some strengths in cognitive tasks compared to males	NA	females with ASD scored higher in verbal learning, memory, and psychometer speed; neurotypical females also scores higher	narrow age range, small sample size	
(Enticott et al., 2016)	27 w ASD, 23 controls	N/A; age at time of study: 19-56	whole brain analysis with fMRI	highlighted a need to consider sex differences	NA	males with ASD had reduced activity in pSTS when processing social info	small samples	**pSTS linked to integrating sensory and social info
(Hartley et al., 2008)	157 males, 42 females	N/A; age at time of study: 1.5-3.9	MANOVA	sex differences were subtle but noteworthy	97 participants Caucasian, 102 Other	girls had more sleep problems and symptoms of anxiety or depression; boys displayed higher levels of restricted and repetitive behaviors	small sample size, especially females	
(Hiller et al., 2014)	69 males, 69 females	N/A; age at time of study: Males, $\bar{x}$ = 8.76; Females $\bar{x}$ = 8.06	cross-sectional design	Sex differences in overt behaviour presentation, restricted interests and school presentation	NA	some behavioral patterns varied between sexes	small, specific sample	
(Kissel et al., 2022)	5 studies, 169 participants	NA	comparative design	biological sex differences affecting ASD symptoms	NA	differences in gene expression; sex-specific alternations in brain regions	small sample size, limited demographic data	
(Rippon, 2024)	48	NA	meta-analysis	points out neglect of females in ASD research;	NA	vmPFC activation (rewarding stimuli) in females but not males	no new data on sex differences; demographics not mentioned	

Social Masking: Results and Discussion

Camouflaging, also referred to as social masking (Allison et al., 2017b; Dean et al., 2017), is used as a coping mechanism that involves concealing actions or manners associated with ASD, or more specifically, "using explicit techniques to appear socially competent." (Allison et al., 2017b, para 1). In places where the disorder can be identified in children, such as in the classroom, camouflaging can feel like a coping mechanism to the person masking their ASD symptoms in the sense that they might feel like they fit in with others more, but this also prevents teachers and clinicians from being able to distinguish ASD and work towards early intervention (Dean et al., 2017). Masking ASD symptoms makes diagnosing difficult for clinicians because those who mask will observe and mimic social skills deemed socially normal in order to feel accepted by others (Allison et al., 2017b; Clarke et al., 2021; Radulski, 2020).

Results

Some studies on social masking relied heavily on qualitative interviews (Allison et al., 2017b; Anderson et al., 2023; Burns et al., 2016; Clarke et al., 2021; Field et al., 2024; Raz & Schneid, 2020) to explore subjective experiences of camouflaging. Others used more quantitative approaches (Dean et al., 2017; Hull et al., 2020; Jorgenson et al., 2020) to measure personality traits, emotional intelligence, and gender/sex differences associated with camouflaging. Overall, strong effects were found in most of the reviewed sources, but each source had its limitations. See Table 1 for more details.

Discussion

Creating and performing strategies to seem neurotypical is found to be more common in females with autism spectrum disorder than males with autism spectrum disorder (Allison et al., 2017b; Clarke et al., 2021; Hull et al., 2020). In fact, Dean et al. (2017) found that the young males in their research were more likely to have socially unaccepted special interests and repetitive behaviors. In contrast, the young females had more admissible interests and behaviors and were less likely to be noticed and reported by teachers. Further outcomes would include the young males having a higher likelihood for intervention and treatment since school faculty members play a significant role in identifying early signs of ASD (Dean et al., 2017).

In cases where males engaged in camouflaging, they were often more satisfied with themselves than the females, who tended to internalize their actions (Clarke et al., 2021). Hull et al. (2020) and Radulski (2020) discuss how the effects of internalization can lead to negative consequences, including the following: fatigue (Hull et al., 2020), mental health issues (Hull et al., 2020; Radulski, 2020), identity crisis (Hull et al., 2020), loneliness (Schiltz et al., 2021), and suicidal ideations (Hull et al., 2020). Therefore, women and young girls who regularly camouflage and meet ASD criteria are more likely to have lower mental health wellbeing (Allison et al., 2017b; Radulski, 2020) compared to the males who either do not camouflage and receive ASD intervention (Dean et al., 2017), or the males who feel content after camouflaging (Clarke et al., 2021). Due to the included internalized effects and less probability of ASD identification for women and young girls, there is a prospect of many receiving a delayed or wrongful diagnosis, resulting in abnormal levels of anxiety and depression.

Motivations Behind Social Masking

In a study conducted by Burns et al. (2016), 10 adolescent girls aged 13-19 years with a diagnosis of autism spectrum disorder participated in semi-structured interviews, during which they shared their accounts of experiencing hardships in social environments. Before interviews began, the participants were asked to draw a circle on a sheet of paper to indicate themselves. They were also asked to draw a triangle for each friend they have and place it at a distance that they think signifies how close they are to this friend. Although the results were not included in the final data examination, the pages with the drawings were used to gain an understanding of the social situations that occurred with each individual prior to the interviews.

After the interviews were conducted, interpretative phenomenological analysis (IPA) was used to analyze the collected data. IPA approaches data by using familiarization, which involves identifying key words in the study, recognizing common or related themes in each participant's answers, and grouping these ideas into broader subject matters. In the analysis, input from parents was included in the results section, but they typically only commented when their daughters were unable to verbally communicate their experiences during the interview process. After the interpretative phenomenological analysis was complete, the individuals were given time to review their results and were encouraged to comment on the accuracy of the analysis. When the participants had something to add, their feedback was also included in the study. To reduce bias, a researcher who was not involved in this study reviewed the entire process and concluded that there was no evident bias.

Overall, there were concluded to be three "superordinate themes," with the responses of the 10 adolescent girls with ASD, which include the following: "experiences of social environment," "desire for friendships," and "overcoming challenges."

Experiences of Social Environment. Regarding their feelings and perceptions towards social circumstances, common reactions were narrated as uncomfortable and distressing due to feelings of unsafety and fear of rejection. One participant, under the pseudonym "Emily," stated, "It feels like in my classroom that I'm surrounded by lions… I feel like a mouse, and everyone else is like a giant cat or something." Regarding rejection, Rosie commented, "I would be happy to hang around with them if they would accept me, but they don't." Furthermore, most participants recalled sensory overstimulation in social situations, especially in school when they had to change between classes. Kate said, "I was really sensitive to everything and that was a huge stress cos [I] was like hurting physically as well… loud noises used to really scare me and hurt in my head."

Desire for Friendships. In this theme, participants discussed their experiences with yearning for friendships, their motivations for forming new friendships, and the challenges of creating and maintaining them. Each of the ten individuals expressed the desire to have friendships but felt they had to work extra hard to meet new friends and keep those friendships. They also showed tremendous gratitude for their friends. Rosie explained, "When I'm not with friends… I… think of all the bad things in life and just carry on thinking about them over and over and over and over until I get really depressed."

Regarding group communication, most participants found engaging in groups to be distressing, resulting in withdrawal from group participation. Emily shares her experience by saying, "With a group, there's loads of different people all at different times and it turns into a murder mystery game of Cluedo where somebody made this go wrong, we've got to find out who it is, people blaming each other, splitting each other up and just wrecking everything. I don't like it at all." Another factor contributing to social group withdrawal was social exhaustion, which led to the deterioration of friendships over time. Kate states the following in her account, "I don't really talk to people as much as most other people cos quite often, you know, it's too much effort. So it's a bit stressful cos you have to sort of think about the other person's feelings, it's just a bit too much for me sometimes… but I do worry quite a bit like if the friendship starts to deteriorate and they don't see me as friends any more."

Overcoming Challenges. All ten girls in the study expressed the need for support from others to make new friends, whether it be from their parents or those who initiated interactions first. Five out of the ten participants also stated that they practiced empathy to build social skills. Gemma gives a good example: "I have a very good memory so I can… relate that to a situation the other person's in… I sort of used that memory and just associated with what she knew." Additionally, many participants imitated their peers to minimize the risk of standing out. For example, Laura mentioned feeling the need to copy others, but not in an overt way. Gemma described similar experiences: "I would try and copy them but not look like I was exactly copying them, so if they were playing a game and they moved and they did something, then I would try and copy it but not exactly like them." Every girl in the study described feeling "anxious" and "unhappy" in social circumstances and explained how they mask their feelings, whether by putting on an overly joyful face or an excessively blank stare. The interviewer asked Gemma how masking affects her emotionally, and she described how tiring it was to keep up a persona. To cope with the emotional baggage that comes with masking, five out of the 10 participants talked about how they had tried self-harm or had suicidal tendencies. Joëlle said, "I was getting to the point where I actually couldn't control some urges that I had… I was a little bit suicidal."

Limitations

This review had several limitations. First, a few sources discussed the personal experiences of individuals diagnosed with ASD who camouflaged (Allison et al., 2017b; Dean et al., 2017). Although there were possible explanations for the differences between females and males, research was limited in explaining why this discrepancy occurred. Smaller samples, which limited the generalizability of findings, were also a common issue. Another significant limitation is the exclusion of research on anyone with ASD who is not a biological male or female. If women with ASD are more likely to camouflage, hypothetically, due to a biological issue, what does this mean for trans and nonbinary individuals? Studies testing this issue are scarce. Cultural factors may also limit research, as most studies typically involve women from Western cultures and countries. Further research is needed to investigate the experiences of autistic women from non-Western cultures and countries.

Clinical Implications

Social masking creates significant challenges when it comes to diagnosing and treating autism, especially in females who tend to mask their symptoms more often (Allison et al., 2017b; Dean et al., 2017). Clinicians need to realize that people with ASD might use intentional strategies to hide their traits in social situations, like copying behaviors that are seen as more socially normal to fit in (Allison et al., 2017b). This might help the person feel more accepted by others, but it can also delay or prevent a proper diagnosis, especially in environments such as schools, where early detection is crucial for receiving the right interventions at the right time (Dean et al., 2017).

Gender Bias in Diagnostic Tools: Results and Discussion

Even though there is not a ton of research on gender bias in autism diagnoses, some studies bring up valid concerns about how the belief that ASD is more common in males may influence the traits clinicians focus on during evaluations (Allison et al., 2017a). Diagnostic tools are often developed using data from predominantly male participants, which tends to emphasize behaviors more typical of males, such as noticeable social issues and narrow interests. Diagnostic tools with a male-focused approach can unintentionally lead to overlooking how autism presents in females, who may express different or more subtle symptoms. For example, girls with ASD might internalize their difficulties or use strategies like camouflaging, making their symptoms harder for clinicians to pick up on (Allison et al., 2017b; Dean et al., 2017).

Results

In terms of finding significant data on gender bias in screening tools, most of the sources did not find substantial results, meaning there was not an alarming amount of bias found in ASD diagnostic tools. Some sources found bias in certain items within the diagnostic tool being analyzed, rather than in the overall test. See Table 2 for more information.

Discussion

To investigate gender bias in autism diagnostic tools, Atherton et al. (2023) examined such biases in a random sample of participants, utilizing both quantitative and qualitative data. They conducted two studies to examine implicit and explicit gender biases. In the first study, implicit association tests (IATs) were used to measure unconscious biases in participants, assessing whether they implicitly associated autism with males more often than with females. IATs are commonly used in psychology to reveal biases that participants might not be consciously aware of, making them a valuable tool for exploring implicit associations. The second study examined explicit biases by presenting participants with hypothetical scenarios describing autistic traits. These scenarios included both male and female characters to see if participants were more likely to associate autistic traits with men than with women. This approach helped the researchers test conscious gender biases in participants' perceptions. Combining implicit and explicit measures allowed the researchers to provide a more complete picture of gender biases in ASD perceptions.

Both studies found a strong gender bias in how people perceive autism. The implicit association tests revealed that participants tended to associate autism more with males than with females. The bias was also seen in the scenario-based study. For example, participants were more likely to associate autistic traits with male characters, even when the descriptions of traits were exactly the same for both genders. These results could point to a deeply rooted belief that autism is primarily a "male" condition, which could impact how autism gets recognized, diagnosed, and supported for different genders.

Limitations

A common limitation across the reviewed studies was the use of small samples, which limited the generalizability of the results. In addition, most of the analyzed sources did not include demographic data, omitting potentially critical information that could impact the interpretations. See Table 2 for the complete list of limitations.

Clinical Implications

Updating screening tools to incorporate the diversity of ASD presentations between males and females, especially by considering factors like camouflaging and internalized symptoms, could help clinicians provide earlier, more accurate diagnoses. Improved tools might also encourage clinicians to address the broader spectrum of ASD experiences, ultimately leading to more comprehensive care (Lai & Szatmari, 2020).

The Female Phenotype: Results and Discussion

The theory of the female phenotype in ASD suggests that females may frequently go undiagnosed, be misdiagnosed, or face delays in their diagnosis because there is not enough research on the female presentation of ASD. Although there is limited research, existing studies have indicated that males and females with ASD show different behavioral presentations of symptoms, emphasizing potential sex differences. However, there is insufficient evidence to definitively determine whether these differences are specific to ASD or also present in the general population (Bishop et al., 2020; Demetriou et al., 2021). For instance, Demetriou et al. (2021) found that females with ASD tend to display higher cognitive performance compared to males. However, it is still unclear whether this difference is exclusive to females with ASD or reflects a broader trend seen in neurotypical females as well. This cognitive advantage could make ASD symptoms less noticeable in females, leading to underdiagnosis. In addition, the cognitive performance of individuals with ASD can vary significantly in areas such as adaptive behavior, social interaction, restricted and repetitive behaviors (Bishop et al., 2020), as well as verbal learning, memory, and processing speed (Demetriou et al., 2021). These aspects of cognitive functioning can complicate the diagnostic process for ASD because diagnostic tools may not sufficiently capture the factors that affect diagnosis. As a result, some individuals, particularly females, may be overlooked or misdiagnosed. Wrongful diagnosis prioritizes the need for more gender-sensitive research and diagnostic criteria to address these factors more accurately.

Results

Researchers used a range of methods, from neuropsychological testing and behavioral assessments to neuroimaging and transcriptomic analyses, to explore the female phenotype of ASD. Many studies relied on standardized diagnostic tools to assess ASD traits and used teacher and clinician reports to analyze observable behavior differences by sex. Self-report tools, neuropsychological tasks, and executive function tests were also used to examine camouflaging behaviors, particularly among females. Finally, meta-analyses and systematic reviews were included to collect broad data. Overall, the studies presented significant indications that males and females with ASD often present differently in terms of social behavior, cognitive functioning, and neural activity. Refer to Table 3 for more information.

Discussion

In the study conducted by Demetriou et al. (2021), researchers highlight that ASD affects males and females differently, leading to variations in symptoms and coping strategies. Specifically, the study examines both executive and non-executive cognitive functions through a combination of neuropsychological tests and self-report measures. Cognitive functions refer to mental abilities essential for tasks ranging from basic reasoning to complex problem-solving. Executive functions (EF) are a subset of these, encompassing skills such as working memory, flexible thinking, and self-control. Non-executive cognitive functions, on the other hand, include abilities such as basic information processing and sensory perception.

To examine sex-based differences, the researchers used a combination of standardized neuropsychological tests and self-report measures. Neuropsychological tests are structured tasks or activities designed to assess specific cognitive functions. In this study, tests for executive functions likely included tasks measuring working memory, cognitive flexibility, and inhibitory control, all of which are commonly assessed in ASD research. Self-report measures allowed participants to describe their own cognitive and emotional experiences, adding a subjective component to the objective data collected.

Demetriou et al. (2021) found significant differences between males and females with ASD in both executive and non-executive cognitive functions. In executive function tasks, females with ASD generally performed better on measures related to working memory and cognitive flexibility compared to males. Working memory, which is the ability to hold and manipulate information for short periods, is essential for tasks such as problem-solving and decision-making. Cognitive flexibility, or the ability to switch between tasks or thoughts, is crucial for adapting to new situations. These results suggest that females with ASD may have specific cognitive strengths compared to males with ASD, possibly due to their tendency to develop coping strategies that help them navigate social environments.

Limitations

Research on the female phenotype in ASD faces several limitations. First, much of the existing data is based on small sample sizes, which limits generalizability and the ability to capture the full range of experiences among females with ASD. In addition, self-report methods were commonly used among reviewed sources; research could be influenced by personal bias or social desirability. Lastly, many of the qualifying studies had small samples of females compared to males. Refer to Table 3 for further discussion of limitations.

Clinical Implications

The female phenotype often presents with subtle or atypical symptoms, including increased social motivation, camouflaging behaviors, and internalizing difficulties like anxiety and depression (Dean et al., 2017; Hull et al., 2020). These characteristics can lead to misdiagnosis or delayed diagnosis in girls, who might not exhibit the typical ASD signs observed in boys.

Clinicians need to be aware of these differences and consider modified screening tools and diagnostic criteria that account for camouflaging and internalized symptoms in females, ensuring early and accurate identification (Bargiela et al., 2016; Hiller et al., 2016).

It is essential for families, teachers, therapists, and community members to understand how autism shows up differently in girls and women. Learning to recognize these more subtle signs can help create supportive spaces that reduce the pressure to mask and encourage acceptance. Enhanced understanding among those closest to autistic females can also help reduce social stigma and create settings where girls feel safe being themselves (Burns et al., 2016).

General Discussion

In studying the barriers to diagnosing autism spectrum disorder (ASD) in women, it has become apparent that traditional diagnostic criteria and tools are not fully equipped to identify autism in females accurately. Research highlights that ASD often presents differently in women and girls, with more hidden symptoms compared to the typical male ASD presentation, on which diagnostic criteria were originally based (Dean et al., 2017; Hull et al., 2020). Females with ASD are often more socially motivated and engage in camouflaging behaviors, where they consciously mask or adapt their behaviors to fit social expectations. This ability to camouflage can lead to delayed or missed diagnoses because outward signs of autism may be less visible or appear differently than in males (Bishop et al., 2020; Demetriou et al., 2021; Haney, 2016).

In addition, females with ASD often experience internalizing symptoms like anxiety and depression, which are not always associated with autism in standard assessments but are prevalent among autistic women (Allison et al., 2017b; Haney, 2016). This highlights the need for more inclusive, gender-sensitive diagnostic practices and criteria to ensure timely and appropriate support for females with ASD. Limited research involving this field also highlights the need for more studies to better understand why women are overlooked in diagnosis.

Conclusion

The growing awareness of disparities in autism diagnoses between men and women has led to increased focus on three key theories of why females are not being properly diagnosed: higher rates of social masking, gender bias in diagnostic tools, and the theory of a female phenotype for autism. Each of these explanations not only sheds light on the reasons behind underdiagnosis but also highlights the significant mental health consequences for women who remain undiagnosed or misdiagnosed.

Researching and addressing the underdiagnosis of autism in women should be essential for promoting equity in mental health care. By understanding the role social masking plays in hindering diagnosis, challenging gender biases in diagnostic tools, and exploring the female phenotype, healthcare professionals can develop more inclusive diagnostic criteria and interventions. This shift would not only validate the experiences of autistic women but also empower them to access the support and accommodations they need to thrive. Investing in this area of research would ultimately promote a more inclusive and compassionate society that recognizes and meets the diverse needs of all individuals.

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Can Musical Aptitude Predict Language Skills? Exploring the Connection Between Pitch, Rhythm, and Phonological Decoding

Lia Brooks

ABSTRACT

This study contributes to the body of literature differentiating the effects of innate musical aptitude from those of formal music training. Few studies have examined how distinct components of music, such as pitch and rhythm perception, are differentially related to phonological skills. To consider the phonological element, a study was conducted in which a total of 20 individuals were recruited from the MTSU community. All participants were native English speakers, aged 18–22, and reported no history of hearing or language disorders. The study found that musical training did not predict awareness and did not demonstrate a transfer effect beyond innate musical ability, and that the relationship between musical rhythm and linguistic rhythm aptitudes shows potential transfer across these domains.

Introduction

The power of music is ubiquitous. Music is fundamental to the human condition, enlightening our lives through its beauty and its singular capacity to elicit emotion. While the aesthetic properties of music are widely appreciated, the cognitive underpinnings of musical ability, and its potential connections to other cognitive domains, such as language processing, remain fertile ground for inquiry. Theories abound on the conception of musical ability. These include music training and musical aptitude. Music training is defined as formal instruction and continued practice, resulting in enhanced musical performance and understanding. Musical aptitude, on the other hand, denotes a natural predisposition, a talent characterized by perceptual abilities such as the capacity to recognize different pitches and rhythms. This study set out to explore the relationship between musical aptitude—specifically, the ability to discern pitch and rhythm—and phonological skills, with a focus on the role of phonemic and prosodic awareness, two linguistic skills essential to understanding spoken language.

Link Between Phonological Processing Skills and Language Abilities

Phonemic decoding and prosody awareness are key elements of spoken language production as well as comprehension. Each represents a phonological processing skill. Phonemic decoding is the ability to identify, understand, and manipulate phonemes—the smallest units of sound in language. Prosody awareness involves the sensitivity to, and understanding of, the "music" of speech, in which rhythms, stresses, and intonations contribute to the communication of meaning and emotion. While these skills are crucial for spoken language, evidence suggests they are also important for reading. Phonemic awareness, for example, allows readers to understand how different phonemes are represented by a combination of letters that help individuals recognize written words and their meaning. According to Carruth (2019), thedevelopment of more advanced reading skills relies heavily on a solid foundation in these basic skills. As for prosody awareness, the ability to decipher the complex stresses and intonations of speech is essential to language, and thus to reading. Research on morphological awareness from Clin et al. (2009) suggests that after accounting for age, nonverbal and verbal abilities, working memory, and phonological awareness, prosodic sensitivity and morphological awareness remain some of the strongest predictors of reading ability. The correlation between these two components may indicate a connection between prosody awareness and reading ability.

Neurocognitive Overlap Between Language and Music

Evidence from cognitive neuroscience research supports some degree of overlap between music and language. For instance, Patel (2003), a leading cognitive neuroscientist specializing in this topic, suggests from neuroimaging data that musical syntactic processing engages brain regions associated with language. According to Drakoulaki (2024), evidence also suggests that language and music rely on hierarchical cognitive control, a neurocognitive mechanism that manages goal selection, maintenance, and inhibition within a structured and timedependent framework. In addition, music relies primarily on scales, rhythms, harmonies, and melodies that follow rules and patterns. Language is organized through phonemes, morphemes, syntax, grammar, and vocabulary, all of which generate meaning through structured patterns. Thus the relationship between music and language development is of key interest. Phonemic awareness, for example, is intertwined with music. According to Eccles et al. (2021), music discrimination skills predict phonemic awareness because both the auditory musical tones and speech phonemes are processed in overlapping brain regions. This supports the argument regarding perceived interconnectedness. The second element of prosody awareness is also affected by music related content. In a research study on music and speech prosody, Hausen etal. (2013) found evidence that the perception of rhythm may connect speech prosody perception with music perception. The article's design consists of computerized tasks measuring pitch perception, visuospatial perception, and speech prosody (i.e. word stress) perception.

Relationships Between Musical Ability and Language Skills

According to a study by Anvari et al. (2002) with children ages 45 years old, music perception skill is related to phonological awareness. Additionally, recent findings suggest that improvements in phonological awareness can be observed after musical training. For example, in a study by Vidal et al., (2020) on children as young as 4, music classes, provided at a frequency of one 45minute lesson per week over 30 weeks, resulted in greater improvement in phonological awareness skills compared to visual arts training. This may be partially due to the awareness of rhythm, stress, and intonation involved in music and phonological comprehension. There is a growing body of research that suggests an interconnectedness between language and music. This hints at a potential crossdomain transfer of skills. To start with, music and phonological awareness are potentially related. In a metaanalysis on music training and its effects on phonological awareness involving 13 different studies, Gordon et al. (2015) suggests that because of their shared auditory nature, music training may have a greater impact on phonological awareness than on reading. In addition, Gordon et al. (2015) suggests that there are better phonological skills in those with music experience than their nonmusical peers. It is important to note that the shared auditory aspects of music and language, and their inherent structural hierarchical similarities, could be a reason why they appear to be connected. The syntactic rules and sheet music rules share a level of hierarchical organization that is built from smaller parts to larger ones, such as in the case of a quarter note versus a half note.

As a result, music training could benefit individuals with language or reading difficulties. After 7 months of music training in a randomized controlled trial involving dyslexic children, Flaugnacco et al. (2015) found rhythmic reproduction, rather than working memory or auditory attention, was the strongest predictor of phonological awareness. In line with this study, Dumont et al. (2017) found that 26 children with musical experience outperformed 30 children without musical experience in auditory processing and phonological awareness.

However, it is important to note that recent studies argue that some of the association between musical ability and language skills may be at least partially due to preexisting differences in musical aptitude rather than the music training itself (Swaminathan and Schellenberg, 2020). Thus, the respective role of musical aptitude versus music training remains to be fully understood.

Thesis Statement

While there are several studies looking at the association between musical ability and phonological skills, there is a lack of research that seeks to more specifically distinguish the effects of musical aptitude versus music training. Another gap in literature is the limited number of studies exploring how specific aspects of music (e.g., pitch versus rhythm perception) relates to phonological skills. Therefore, the main research questions that were examined in the present study are as follows: 1) Does music aptitude predict phonemic and/or prosody awareness after controlling for musical training experience? 2) Do specific types of music aptitude (pitch versus rhythm) have stronger relationships with distinct phonological skills (phonemic or prosody awareness)?

To address these questions, participants completed a series of validated measures assessing phonemic awareness and lexical stress sensitivity. Musical abilities were measured using a normed assessment of music aptitude and a music interest questionnaire to determine their level of musical training. Multiple regression analyses were used to explore how musical aptitude and training predict performance on measures of phonological awareness (phonemic awareness and lexical stress sensitivity). Based on previous studies (Swaminathan and Schellenberg, 2020), it is predicted that musical aptitude will have a stronger association than music training with prosody and phonemic awareness. It is hypothesized that rhythm will have a stronger association than pitch discrimination with prosody skills, while both pitch and rhythm will be associated with phonemic awareness.

The significance of the study includes potential implications of this research for educational and language practices. For all research, there is always a question of why it is meaningful to look at phonological awareness and music. Why this particular topic? This topic was chosen because phonemic and prosody awareness each play a complementary role not just in spoken words, but also in reading development. In this case, it comes down to two main topics. To start, there may be possible interventions for language disorders utilizing music. Secondly, there may be educational benefits to using music in a classroom setting. Could these findings inform us of music education curricula or interventions for language development? For example, songs are used in classrooms to facilitate learning. Using music to aid in essentials like reading can boost these skills. In language disorders, increased prosody and phonemic awareness could possibly be related to understanding of language's structure and word stresses. The contribution the study could make to the broader field of research on music cognition and language development would be an important addition to the literature. It could also provide new insights into the mechanisms underlying crossdomain transfer of skills.

Methodology

Participants

The sample size was 20 participants recruited from the MTSU community, as well as the psychology research pool. Their ages ranged from 18 to 22 years old. Participants were native speakers of English with no history of hearing or language disorders. Participants also had normal or correctedtonormal vision (i.e., contact lenses or glasses). Participants signed an informed consent form before beginning the experiment. They also filled out a demographic questionnaire.

Measures

Music Aptitude. The Advanced Measures of Music Audiation (AMMA) created by Gordon (1989) assesses participants' music aptitude, focusing on inherent musical potential rather than acquired skills. Participants listen to pairs of melodies and judge whether they are the same or different. When answering "different", participants must specify if they believe the melodies are rhythmically or tonally different. The AMMA yields two subscores: Tonal, which evaluates the perception of melodic patterns, and Rhythm, which assesses the perception of rhythmic patterns. This standardized assessment is designed for individuals from grade 7 through adulthood.

Music Training. Participants complete a sixquestion Music Interest Questionnaire (MIQ). It is a selfreport measure that explores their musical experiences, including skills, practice habits, and achievements.

Lexical Stress Sensitivity. The Test of Prosody via Syllable Emphasis (TOPSY) developed by Nayak et al. (2024) measures the sensitivity to lexical stress in words. The TOPSY is a computerized test that consists of 28 multisyllabic spoken words. During each trial, participants listen to a recorded multisyllabic word while simultaneously viewing a visualrepresentation of the word segmented by syllable on the screen. Participants are instructed to identify which syllable has the main emphasis and click on the number that represents the syllable they perceived as stressed.

Phonemic Awareness. Participants' ability to understand and manipulate the sounds in spoken words (i.e., phonemes) is assessed using the phonemic proficiency subtest of the Wechsler Individual Achievement Test - Fourth Edition (WIAT4). Participants verbally respond to questions that ask them to change sounds within words, such as removing, replacing, or adding a phoneme to make new words (e.g., say "cat" but change the /c/ sound to a /b/ sound in it). The questions are presented through audio recordings, and the examiner gives feedback after each answer. The final score is based on both how quickly and how accurately the participant responds.

Experimental Procedure

Upon arrival, participants were greeted by the experimenter and provided with informed consent. They also filled out a demographic questionnaire. Following consent, participants completed a series of assessments, as described previously, including measures of musical training, musical aptitude, lexical stress sensitivity, and phonological awareness. The order of the musical (training and aptitude) and phonological (lexical stress and awareness) measures was counterbalanced across participants. The total testing session is expected to last approximately one hour.

Statistical Analysis

Statistical analyses were conducted using Jamovi software. Pearson correlations were first calculated to explore the relationships among all experimental measures. To address the first research question, determining the unique contribution of musical aptitude and musical training, two separate hierarchical multiple regression analyses were performed. In both regressions, the independent variables were entered in two steps based on their presumed temporality: Musical Aptitude (comprising AMMA Tonal and AMMA Rhythm scores) was first entered to account for innate ability while Musical Training was entered next to determine if it explains significant unique variance in the outcome variables above and beyond aptitude. The outcome variables for these two regressions were lexical stress sensitivity and phonemic awareness.

To address the second research question investigating the specific relevance of the two musical aptitude components, two separate multiple regression analyses were performed for the Aptitude components. AMMA Tonal and AMMA Rhythm scores were used independent variables, while the outcome variables for these two regressions were lexical stress sensitivity and phonemic awareness.

Results

Descriptive Statistics

Table 1 presents the descriptive statistics for the Advanced Measures of Music Audiation tonal (AMMA T) and rhythm (AMMA R) subtests, the Test of Oral and Written Language Skills (TOPSY) Lexical Stress Perception subtest, the Wechsler Individual Achievement Test Phonemic Decoding subtest (WIATPD), and musical training in hours per day.

Table 1

Descriptive Statistics

	Mean	Median	SD	Range	Minimum	Maximum
WIATPD	58.60	59.00	11.57	50	26	76
TOPSY	54.63	46.40	22.33	67.9	32.1	100
AMMA T	24.95	25.50	5.44	18	18	36
AMMA R	26.25	26.00	4.83	19	16	35
Music Training	1.45	1.00	1.43	5	0	5

Correlation Analyses

To examine the relationships among all experimental variables, Pearson correlations were calculated among music training experience, specific music aptitudes (pitch and rhythm), and phonological awareness measures (phonemic and prosody). The resulting correlation coefficients, along with their significance levels, are presented in Table 2. Notably, music training was only significantly correlated to lexical stress perception (r = 0.54), but not phonemicdecoding (r = 0.31). AMMA rhythm performance was significantly and positively correlated with both phonological measures (lexical stress perception r = 0.54, phonemic decoding ability 0.52) while AMMA Tonal performance was only significantly correlated with lexical stress perception (r =0.48) and not phonemic decoding (r = 0.32).

Table 2

Correlation Matrix

	PD	TOPSY	AMMA T	AMMA R	Music Training
PD	—				
TOPSY	0.57**	—			
AMMA T	0.32	0.48*	—		
AMMA R	0.52*	0.54*	0.79***	—	
Music Training	0.31	0.53*	0.62**	0.58**	—

Note. * p < .05, ** p < .01, *** p < .001

Hierarchical Regression Analyses

A twostep hierarchical linear regression was performed to examine the unique contribution of Music Training to the prediction of the phonological variables, after accounting for the effect of music aptitude (total AMMA score).

Phonological Decoding. In Step 1, total AMMA was entered, and the model approached statistical significance, F(1,18) = 4.29, p = 0.053, explaining 19.2% of the variance in phonological decoding (R2 = 0.19). Total AMMA also approached significance as a unique predictor (β = 0.522, t(18) = 2.07, p = 0.053). In Step 2, Music Training was added to the model. The inclusion of Music Training resulted in a nonsignificant change in variance explained (ΔR2 = 0.002, F(1,17) = 0.024, p = 0.878).

Lexical Stress Perception. In Step 1, total AMMA was entered as the sole predictor. This model was statistically significant, F(1,18)=7.35,p=0.014, and accounted for 29.0% of the variance in TOPSY (R2 = 0.290). Total AMMA was a significant positive predictor (β = 1.24, t(18) = 2.71, p = 0.014). In Step 2, Music training was added to the model. While the overall model remained significant (F(2,17) = 4.48, p = 0.027), the inclusion of music training resulted in a nonsignificant increase in explained variance (ΔR2 = 0.055, F(1,17) = 1.43, p = 0.248). Therefore, Music Training did not account for a significant unique proportion of the variance in TOPSY beyond that explained by Total AMMA.

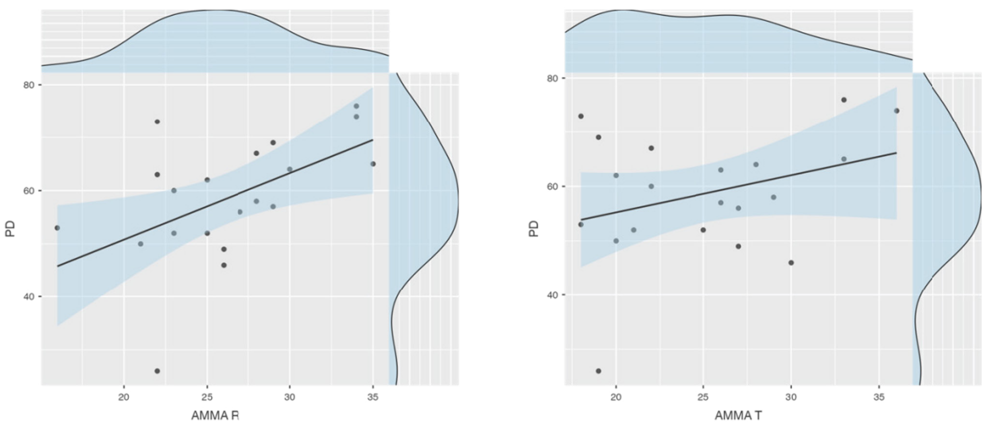
Multiple Linear Regression

A linear regression was conducted to examine the relationship between each AMMA subscore (tonal and rhythm) and each phonological dependent variable.

Phonological Decoding. The model significantly explained a moderate proportion of the variance in phonemic decoding (F(2,17) = 3.53, p = 0.05, R2 = 0.29). AMMA rhythm was a statistically significant positive predictor (β = 1.702, t(17) = 2.143, p = 0.047), holding AMMA tonal constant. However, AMMA tonal was not statistically significant (β = −0.511, t(17) = −0.724, p = 0.479). See Figure 1.

Figure 1

Relationship Between Musical Aptitude and Phonological Decoding Skills

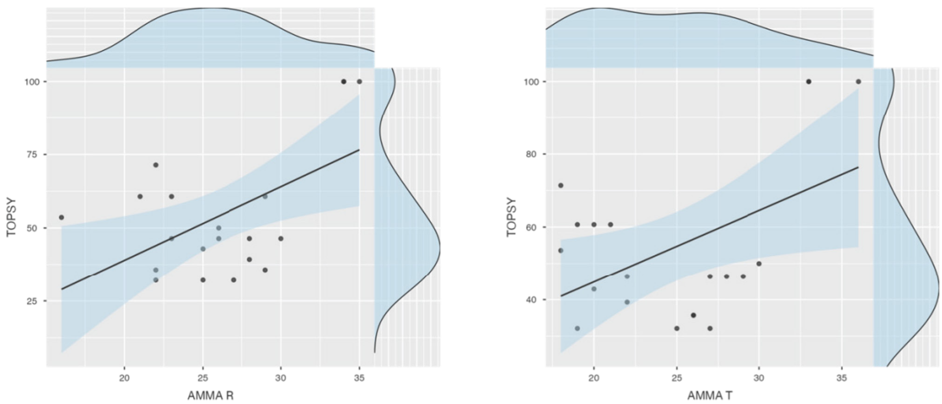


Note. The scatterplots display the relationship between Phonological decoding scores (on the yaxis) and musical rhythm scores (left panel) or musical tonal scores (right panel). The solid black line represents the linear regression fit, illustrating the overall trend. Shaded gray areas surrounding the regression line indicate the 95% confidence interval for this fit. The density plots in the top and right margins show the distribution of each variable.

Lexical Stress Perception. The model was also statistically significant, (F(2,17)=3.67,p=0.047), explaining 30.2% of the variance in TOPSY scores (R2 = 0.302). Despite the overall model being significant, neither individual predictor contributed uniquely and significantly to the model (AMMA rhythm: β = 2.007, t(17) = 1.317, p = 0.205; AMMA tonal: β = 0.563, t(17) = 0.416, p = 0.683), suggesting that each musical aptitude when considered together, contribute meaningfully to the variance in the outcome, but their shared variance or combined effect is what drives the significance, rather than the unique contribution of any one of them. See Figure 2.

Figure 2

Relationship Between Musical Aptitude and Lexical Stress Perception



Note. The scatterplots display the relationship between lexical stress perception scores (on the y-axis) and musical rhythm scores (left panel) or musical tonal scores (right panel). The solid black line represents the linear regression fit, illustrating the overall trend. Shaded gray areas surrounding the regression line indicate the 95% confidence interval for this fit. The density plots in the top and right margins show the distribution of each variable.

Discussion

The present study aimed to clarify the relationship between musical aptitude, musical training, and phonological skills. Specifically, two research questions guided this investigation: (1) Does music aptitude predict phonemic and/or prosody awareness after controlling for musical training experience? (2) Do specific types of music aptitude - tonal versus rhythm - have stronger relationships with distinct phonological skills such as phonemic or prosody awareness?

Findings are expected to contribute to the growing body of research linking music and language by more precisely distinguishing between the effects of inherent musical aptitude and formal music training. It was predicted that musical aptitude, rather than training experience, would show stronger associations with both prosody and phonemic awareness. Moreover, rhythm perception was hypothesized to be more strongly related to prosody skills, whereas both rhythm and pitch are expected to correlate with phonemic awareness. As suggested earlier by Eccles et al. (2021), music discrimination skills or music aptitude predict phonemic awareness because both the auditory music tones and speech phonemes are processed in brain regions that overlap. After accounting for the study conducted, this was found to be evident in the correlational data.
In addition, Hausen et al. (2013) found evidence that suggested that the perception of rhythm may connect speech prosody perception with music perception, which is also seen in the correlational data below.

Music Training, Musical Aptitude, and General Phonological Awareness

This section will focus on the first question: Does music training predict phonemic and/or prosody awareness after controlling for musical aptitude? The results related to music training experience (duration) as a predictor of phonemic and prosody awareness were interesting. Music training was only significantly correlated to lexical stress perception, but not phonemic decoding. Considering the control variable of general musical aptitude (hierarchical regression analyses) in phonological decoding, the inclusion of music training resulted in a nonsignificant change in variance explained. In lexical stress perception, music training did not account for a significant unique proportion of the variance in TOPSY beyond that explained by Total AMMA. Musical training therefore did not predict awareness and did not suggest a transfer effect.

Differential Relationships Between Specific Musical Aptitudes and Phonological Skills

This section directly tackles the second question: Do specific types of music aptitude (pitch versus rhythm) have stronger relationships with distinct phonological skills (phonemic or prosody awareness)? Pitch aptitude was more strongly related to prosody awareness, possibly due to shared processing of acoustic variations like pitch/intonation. Rhythm was related to both prosody awareness and phonemic decoding. It appeared that the relationship between musical rhythm and linguistic rhythm shows potential transfer across domains, versus a general cognitive enhancement.

Theoretical and Practical Implications

Improved sensitivity to these prosodic/lexical stress cues then provides a clearer structural framework for the sublexical phonemes, thereby facilitating the segmentation and manipulation required for phonemic decoding. In essence, the ability to parse words prosodically supports the ability to parse them phonemically. Thus, the ability to be attuned to lexical stress can help in further understanding words by their phonemes.

Limitations and Future Directions

The study had a small sample size (N=20). There are inherent risks in research with smaller sample sizes, such as generalizing the results to other similar topics. All research findings should have replication studies performed to see how reliable the results are. The data in the study are correlational and cannot definitively prove causality (the arrows in the mediation model reflect statistical relationships, not confirmed developmental direction). Future research could replicate the study with larger, more diverse samples (including various age groups or clinical populations) and conduct longitudinal or intervention studies where rhythmic skills are explicitly trained and then measure changes in both lexical stress perception and phonemic decoding to establish the developmental direction of the pathway.

Conclusion

While several studies have examined the relationship between musical ability and phonological skills, there remains a lack of research that clearly distinguishes the effects of musical aptitude (innate ability) from those of music training (experience-based learning). Another overlooked piece in the literature concerns the limited number of studies exploring how specific aspects of music, such as pitch versus rhythm perception, relate to distinct phonological skills. This study was aimed at providing information on this relative gap in the body of literature.

These findings suggest that interventions focused on rhythmic skill development could serve as a promising, engaging, and nonlinguistic approach to indirectly enhancing prosodic sensitivity, which may contribute to foundational literacy and reading skills. For instance, music-based interventions, such as rhythm and song-based activities, could be used to strengthen phonological skills in those with language or reading disorders, improving sensitivity to topics such as lexical stress. Similarly, incorporating music into classroom learning may enhance foundational language skills and reading acquisition.

Ultimately, this area of research points to the powerful bridge between the domains of music and language. These skills, rooted in pitch, rhythm, phonemic decoding, and lexical stress perception, appear to support a shared cognitive and neural architecture that facilitates both musical understanding and linguistic competence. In revealing this deep interconnection, the study contributes to a growing body of evidence that rhythm and prosody are not merely parallel abilities, but rather core mechanisms that bind music and language together at their most fundamental levels of human communication.

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"How Can Fandom Be Toxic? It's About Love!": A Look at Fandom and the *Scream* Franchise

Amanda Triplett

ABSTRACT

The *Scream* franchise is known for its ironic metanarrative and satirical treatment of the horror genre. The franchise has maintained immense popularity since its inception in 1996. *Scream 2022*, also referred to as *Scream 5*, continues this tradition while introducing a new layer of intertextuality by incorporating the effects of toxic fandom largely online contexts. This paper explores how the new creative team of the 2022 film, Radio Silence Productions, brought their knowledge of fandom to the film, the inclusion of popular horror YouTube creators "Dead Meat," and this iteration of "Ghostface" killers. The fandom's actions mirror the outcry over *Star Wars: The Last Jedi* and *Ghostbusters* (2016), both which are represented in the film through the in-universe franchise "Stab." My aim is to examine what constitutes a "toxic fan" and how such a role is represented within Scream (2022) for a mainstream audience, utilizing studies conducted by Morten Bay, Matt Hills, and William Proctor.

Most everyone is a fan of something: a book, a film franchise, an actor, a sports team. Many seek out others with an equivalent passion, and thus emerges a fandom. In my analysis of *Scream* (2022), which will be referred to as *Scream 5* throughout the essay, I will examine the intertextual connections between the film's metacommentary on emerging film franchise fandoms, with emphasis on increasingly toxic fan behaviors, and their effect on fan-text-producer interrelationships, as represented in the film, in comparison to real-world incidents occurring in the wake of *Star Wars: The Last Jedi* and *Ghostbusters* (2016). In doing so, I will explore how Scream 5 calls attention to toxic fan behavior as a whole, and its effects at the level of the entire film industry, well beyond the horror community.

The *Scream* franchise is known within and outside of the horror community as a series of metacommentaries on movie genres as a whole in its emphasis on intertextuality trope subversion. Horror fans, in particular, are "in on" the satirical commentary central to the films because *they* know the tropes, how they function, and how the audience serves the functions. Each installment of *Scream* has taken on a different aspect of "slasher" sequels, thereby addressing the current state of the horror genre. Following the death of the inaugural film's director Wes Craven in 2015, a new creative team, Radio Silence, became the inheritors of *Scream*'s legacy.

Reviews and interviews with the Radio Silence team well establish that Scream 5 is about toxic fandom. Directors Tyler Gillett and Matt Bettinelli-Olpin discuss this metacommentary in *Variety* interview (Vary), while newcomers to the franchise, Melissa Barrera and Jack Quaid, discuss metacommentary in separate interviews with *The Wrap* during the press promotion of the film (Taylor). Nevertheless, none articulate *how* and *why* the film focuses on toxic fandom beyond their general acknowledgment. The questions addressed can only be answered by an analysis of the film's most pertinent scenes. First we consider contextual information on fandom and how it may have inspired the narrative of *Scream 5*.

Fandom: What Is It—and How Does it Become Toxic?

To better understand *Scream 5*'s commentary on fans and fandom, the terminology and context of "fandom" must be considered. While fan is short for "fanatic," there are several ways scholars have described what a "fan" is. Carrielynn D. Reinhard states a fan as "someone who repeatedly engages with an object of affection" (4). Henry Jenkins takes the notion a step further to include that a fan is someone who participates by "joining a 'community' of other fans who share common interests" (41). Such a fandom can exist for quite literally anything—movies, television, books, celebrities, wrestling—interaction with like-minded people supplies reinforcement.[1] There is also the concept of a "hyperfan" and an attached stigma to this super-level of fan used mockingly in media to portray fans as "miscreants, antisocial loners, or just plain crazed consumers" (Booth 76). Paul Booth goes on to say that "hyperfan[s] illustrate the view that there's always someone crazier than you in fandom" (77).

Ideally, fandom "spaces" are a positive environment for fans to come together and share their affection for the media—a place for relaxation or a respite from life's hardships through discussions or the creation of "fanworks." Nonetheless, this is not always the case. "Toxic fandom" can ensue, in which fans behave negatively or harmfully towards the object of their affection, or attack other fans within the fandom. There is not one definitive definition of a toxic fan, as toxic fan behavior can vary in occurrence and severity from fandom to fandom. John Suler notes that online anonymity brings out toxic fan behavior in manners such as "rude language, harsh criticisms, anger, hatred, even threats," while William Proctor and Bridget Kies argue that the behavior is not inherently toxic "unless it falls into the realm of bullying, racism, misogyny, homophobia, or other types of ad hominem attack based on identity politics and progressive ideologies" (Proctor and Kies 137-8). Both characterizations prove useful in examining the fan behaviors surrounding the *Scream* franchise. Regardless of the definition of toxic behaviors, these elements can be detected in nearly all fandom outlets. Here the focus is on the fan-text-producer, fans reacting to the text and the

1. The scholarship used for them is drawn from an American fandom perspective and does not include a global examination of fan practices.

creators behind it, and toxic behaviors evinced in the type of discourse this film tackles, bracketing other types of interpersonal toxic behaviors expressed within fandoms.[2]

The State of Fandom

To consider the aims of the team behind *Scream 5*, we begin by examining the films that inspired it, and the fan behavior that inspires its metacommentary. Multiple horror franchise reboots and "requels" have been divisive in their fandoms over the past decade. Fans have rejected many such installments, but studios have continued to produce them. *A Nightmare on Elm Street* (2010), *The Texas Chainsaw Massacre* (2013), *Halloween* (2018), and *Candyman* (2021) are just some of the recent reboots, in the case of the first two, and requels, in the case of the latter two. The phenomenon has also been seen in popular culture media such as the Star Trek and Star Wars franchises and countless superhero series. Toxic fandom goes beyond the realm of general horror. Revitalization of the Star Wars franchise, starting with the requel *The Force Awakens* (2017) and the *Ghostbusters* (2016) reboot. These last two franchises, in particular, drew mass media attention for the backlash and toxic behavior elicited in their respective fandoms. By simply calling this film "Scream," without the "5," the creative team intended to invoke this same sense of requel backlash.

Because of the scale of fan-text-producer backlash for *Star Wars: The Last Jedi* (2017) and *Ghostbusters* (2016), their respective studios changed direction and opted for a safer route in their franchise continuations, seemingly afraid to take such risks again (Keiper; Morrow). Critic Brendan Morrow states, "Toxic fandom has genuinely become a major problem in the entertainment industry, to the point that it actively gets in the way of sequels that might otherwise challenge the audience" (emphasis added). *Scream 5* rose to the challenge to deliver a sequel that would intentionally address this kind of behavior amongst its fans.

***Scream* Takes a Stab at its Own Fans**

Radio Silence intentionally brought toxic fandom to the table in *Scream 5*. The film starts with Tara Carpenter (Jenna Ortega) alone and attacked in her home by Ghostface, recalling Drew Barrymore's Casey Becker in the original *Scream* (1996). Ghostface's phone call involves asking her trivia questions about the in-universe movie, Stab, which was based on the original Woodsboro murders. Unlike Casey, Tara survives the attack, which draws her older sister Sam (Barrera) back to Woodsboro with her boyfriend, Richie Kirsch (Quaid). Sam reveals to her sister and boyfriend that she is the daughter of Billy Loomis, one of the killers in *Scream* (1996), as she believes this is the motive behind Tara's attack. This establishes one of many connections back to the original film of the franchise with the supporting cast members. Retired Sheriff Dewey (David Arquette) is pulled into the investigation by Sam for support, as he has been part of this situation many times before. Once it is established the victims and potential victims are all related to characters from the past franchise installments, they are "picked off" one by one, including the legacy character, Dewey.

After the death of Dewey, Sidney Prescott (Neve Campbell), the original target of the previous seven Ghostface killers, makes her return to Woodsboro to help take down Ghostface once again with Gale Weathers (Courtney Cox), who also returns to the city to cover the killings for the news. The final act of the film takes place at Stu Macher's house, the second Ghostface alongside Billy Loomis, echoing the original Scream. Richie and Tara's close friend Amber are revealed to be the killers, working together. Their goal is for their killings to inspire the next Stab movie due to their hatred for Stab 8 in an effort to return the franchise to its roots. With the help of Sidney and Gale, Sam and Tara take down the killers.

Scream 5 is for the fans, by the fans, and about the fans. The film itself is a requel banking on nostalgia, especially of the inaugural film, to pull in longtime fans and springboard the franchise into new territory with new lead characters. The narrative is aware of its place in its franchise with the inclusion of legacy characters, the introduction of new characters that will carry

2. Other types of toxic fan behaviors can be seen involving character hate, shipping discourse, attacks on other fans' interpretations, etc.

the majority of the screen time and references the previous installments. The requel aspect of the film is intentional and integral as a commentary on the recent influx of such self-referential horror productions. Examples include the latest *Halloween* trilogy in the return of Jamie Lee Curtis, and Harrison Ford in *The Force Awakens*. New characters are introduced to carry the narrative while providing a connecting factor for audiences' nostalgia for the original films. Dewey's death is similar in fashion to Han's death by being a shocking kill of a legacy, fan-favorite character.

The quintessential *Scream* "rules of horror" scene provides an encapsulation of *Scream 5*'s commentary on toxic fandom. Here, Mindy Meeks, the niece of Randy Meeks from the original *Scream*, represent the film's resident cinephile and explains to the group what a requel is and how they themselves will function in it as the film progresses. It is during this scene that the audience gets the first acknowledgment of the real-world fan discourse surrounding *Star Wars: The Last Jedi* and director Rian Johnson. It is revealed that Johnson directed the in-universe movie *Stab 8*, which angered the Stab fandom in the *Scream* universe. When Liv, girlfriend of Mindy's twin brother, comments that she liked the movie by "the *Knives Out* guy," Mindy regards her as having "terrible taste." With this dialogue, the vocal fan backlash towards *The Last Jedi*'s poor reception becomes a textual component of the film. The backlash had been heavily covered by journalists and media outlets, resulting in calls to remake the movie and even petitions to have it removed from the *Star Wars* canon (Bay). The bulk of the fan anger was directed at Johnson. While Mindy does call Liv's taste in liking *Stab 8* "terrible," she does not constitute a toxic fan in light of Proctor and Kies' view that rude language and harsh criticism are not toxic behavior. Throughout the remainder of the scene and the film, Mindy is not shown to engage in any toxic behavior demonstrating harm to other characters.

Through Mindy's continued dialogue in the scene, *Scream 5* shines a direct spotlight on fandoms of franchises, including their own. She says to the group gathered, "*Stab 8* pissed on [their] childhoods," and "To some people, the original is their favorite thing in the world. The movie made them love horror." She is repeating the online backlash and toxicity that she has witnessed, which parallels how real fans have reacted to the changes for *The Last Jedi* and *Ghostbusters* (Bay; Proctor 1129). Whether Radio Silence was aware of it or not, Mindy's dialogue falls under what William Proctor calls the "totemic nostalgia" that he applies to fans and their relationship to a given media. "Totemic nostalgia" is defined by Porter as the "non-toxic, and how this might extend into malicious 'toxic fan practice'" (1113). Nostalgia is not always considered a toxic emotion for fans to Porter, but in certain circumstances, he notes, it can lead to it. Mindy echoes this when she says, "God help anyone who slightly fucks with that special memory. Who makes a movie they think disrespects it" about how the "hard-core Stab fans" hate the direction the franchise went with *Stab 8*. Proctor covers how the *Ghostbusters* fandom reacted negatively to the all-female cast reboot in 2016 for his article, "'Bitches Ain't Gonna Hunt No Ghosts': Totemic Nostalgia, Toxic Fandom and the Ghostbusters Platonic." His research into it shows direct similarities to that toxic fan behavior and *Stab 8*'s.

The "rules of horror" scene gives additional nods to fans and their fandom practices by bringing them into the film's text. Mindy mentions real online fan spaces, and communities that are used by fans in context of the film itself to discuss their disliking of the *Stab* film, alienating real-life fans. In the r/horror subreddit "Dreadit" as well as 4chan, user "Sam" delivers the one-liner, "Are you telling me that I'm caught in the middle of fan-fucking-fiction?" This is, in a sense, true, given the motives of the Ghostface killer in the requel. Fanfiction and Reddit are common meeting grounds for fans in today's fandom spaces that can lead to positive experiences for fans, a forum to meet like-minded individuals to share their affection for content. At the same time the forums allow users to engage in toxic discourse.

Once the rules of this film are established, *Scream 5* takes the fan meta-commentary a step further. Two additional fans appear as minor characters in one scene. While they are not present for long, real-life horror YouTubers and podcasters Dead Meat are brought into the film in fan roles. Past *Scream* films have made similar casting choices by bringing in actors to subvert audiences' expectations based on prior familiarity with known actors. Valeria Wee notes the casting of Sarah Michelle Gellar for *Scream 2* to play a defenseless character while well-known for her role as Buffy Summers in *Buffy the Vampire Slayer*. She writes, "Most of the teenagers watching *Scream 2* would be familiar with Gellar's television alter ego and thus would enjoy an additional level of amusement in watching her play against type, as a helpless female victim" (50). Dead Meat's casting is in a similar vein to Geller's in that James and Chelsea are playing against their known, friendly and supportive personalities in portraying toxic fans. Such intertextuality adds complexity to the film's established narrative in juxtaposing real-life personae with fictional personae.

Dead Meat has had a wide impact on today's horror fandom. Their YouTube channel,[3] created in January 2017 by James A. Janisse, began with his series "The Kill Count," breaking down the number of "kills" in a given film while providing production and behind-the-scenes information. The Dead Meat Podcast was subsequently created by Chelsea Rebecca, who researches and provides an in-depth look at various horror topics, such as movie reviews, retrospectives on the genre, and interviews with directors and casts of upcoming horror films. The podcast is co-hosted by Rebecca and Janisse. Together, the ensemble works to create an open community for horror fans that eschews bullying or toxic behaviors.

In the film, the pair play the cohosts of a YouTube channel called "Film Fails" and, while not stated in the movie, the script lists their names as "James" and "Chelsea" (Dead Meat). The scene was filmed on their own set, and their dialogue improvised by them, as a directorial choice. A review of Stab 8 states, "don't even get me started on Ghostface's new signature weapon," adding, "And can we talk about the title? Stab? What, just like the original? Just call it *Stab 8*…. You're not fooling anyone." *Scream 5* viewers who know of the Dead Meat channel fully get the intertextual reference Radio Silence intends to make with their inclusion. Viewers who are not familiar with the channel, but are within the online film or horror fandoms, would be aware of the film's parodic element. Countless channels on YouTube focus on film critiques, and not uncommonly rant videos disparaging directorial choices. Titles for negative videos on *The Last Jedi* include "The Last Jedi: A Complete Cinematic Failure," by Vito, with nearly 10 million views; "Stupidest Things Said Defending Star Wars: The Last Jedi" by Robot Head, with over 4 million views; and "The Last Jedi, and the Assassination of Luke Skywalker" by The Critical Drinker, with over 1 million views. These videos pull in massive amounts of viewers, leading to a wider impact on established fandom circles.

A particular scene depicting Richie watching the Film Fails video serves two purposes. On first viewing, it merely seems as if he is researching the *Stab* films, claiming not to have seen them earlier. He claims to be researching what Mindy has previously brought up, providing audience with a sampling of typical YouTube commentaries. Suggested videos also tend to include additional in-universe videos dealing with the backlash. An interview with Rian Johnson about *Stab 8* points out that until Richie is revealed to one of the killers, the scene is recontextualized to display toxic fan practices. He is watching not just to learn about the fans' backlash to *Stab 8*; he is one of the fans upset by it. When speaking to Sam about what he's supposedly learned about the film, he says, "*Stab 8* is not like the other movies. I mean, no connection to the other movies. No legacy characters at all. If you ask me, this franchise goes off the rails with number five." Even within this tongue-in-cheek statement that brings awareness to the nature of this film's placement in the Scream franchise, viewers are given further insight into Richie's views on *Stab 8*—and on why he resists its narrative contribution to unveiling his motive for killing.

The thematic continues into the third act following the revelation of the killers as Richie and Amber. Richie's monologue unveils his motive for the killings through incorporation of common phrases seen on Reddit and other online spaces express displeasure with the movie's narrative arc. Some potent lines: "Someone has to save the franchise. You see, no one has made a great Stab movie since the first one," and "It sucked balls because nobody takes the true fans seriously" (emphasis added). Richie then drives home Scream 5's toxic fan meta-commentary: "How can fandom be toxic? It's about love! They don't fucking understand that these movies are important to people." This satirically ties back to Proctor's totemic nostalgia turning toxic, and

3. As of April 2024, their channel, which hosted both "The Kill Count" and podcast, has 6.38 million subscribers, and 2.6 billion combined views across 527 videos, showing their significant reach within the horror community.

fans taking their purported "love" for their media too far. It also aligns with Matt Hills' statement that "toxic fan practices can be seen as 'good' by those carrying them out" (114). Richie, and by extension Amber, believe to be doing this for the good of the Stab franchise. They are trying to "save" it. While it is an extreme reaction, exaggerating the rhetoric of real-life fans, the absurdity of their killings showcases the destructive actions of toxic fans, revealing how their toxic practices affect the community as well as the film's creators.

Conclusion: *Scream*'s Reflection on Fans

We return to a key scene, when Mindy is shown to engage with the original *Stab* movie during the third act of the film, watching and talking to the screen as uncle Randy did, even saying "No, Randy, look behind you. … These are your rules!" The lines call back the original *Scream* (1996), recreating the scene when Randy watches Halloween in Stu's house, talking to the screen as Ghostface stalks up behind him. The scene is played for laughs and works as an intertextual reference for the fans. Yet it also shows Mindy exhibiting positive fan behavior. She remains engaged with the media that she loves and is attached to. Her fandom stands in contrast to Richie, who embodies the negative, toxic side of fandom.

With these characterizations, *Scream 5* depicts a diverse fandom. Not all fans are toxic—a necessary contrast to the installment's Ghostface killers. As Daniel Viglietti states in his review, Mindy is "a reasonable fan who dislikes [*Stab 8*] for legitimate reasons, so when Amber Freeman and Richie Kirsch are unmasked as the Killers, they represent the fans who are violently possessive over the franchise and take their obsession too far." While Mindy shares in minor name calling in the "rules of horror" scene, as no fan is perfect, she does not dwell in the negativity and focuses on the part of the franchise she enjoys. Richie and Amber, on the other hand, feel entitled to Stab and do not care how many people are hurt along the way to get what they want for the franchise. By making the toxic fans the killers, the filmmakers made the decision to cast this type of behavior into a villainous role and have the audience root against them. Having this type of fan behavior represented on screen will hopefully serve as a mirror to members of the fandom that engage in this type of behavior and lessen its continuation.

Scream 5 is a novel contemporary representation of the current fan and fandom landscape by fusing the real and the fictional, providing a narrative metacommentary its own mythology. It challenges and breaks down Booth's conception of the hyperfan by including hyperfans in its own narrative. While Mindy, Richie, and Amber fall outside of the antisocial loner stereotype, Richie and Amber certainly exude "crazed fandom" through their killings, allowing the film is to depict two different versions of fans and providing the audience with diverse fan representations. Each representation breaks Booth's "antisocial loner" depiction of hyperfans, updating the popular view of typical fandom in today's culture. Mindy and Amber remain attached to their friend group, while Amber and Richie are both active in online fandom spaces, which leads to their meeting and eventual relationship by virtue of the Stab subreddit. Each serves as a representation of the hyperfan in their simultaneous engagement with the media and the fandom surrounding the film series' mythology.

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