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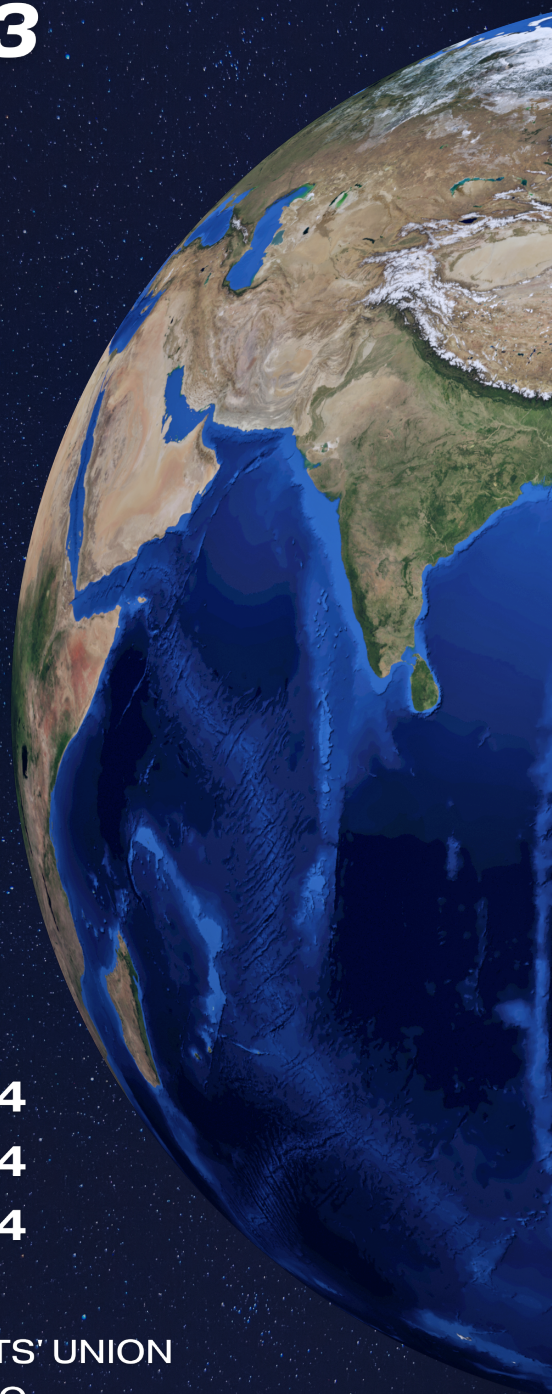
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LETTER FROM THE EDITORS



Dear readers,

We are honoured to present the fourth volume of the Arbor Journal of Undergraduate Research. It has been a pleasure to produce the journal while working alongside our team of fifteen dedicated and talented editors.

Without their meticulous attention to detail, this volume would not have been possible! We thank our editors for their efforts in editing and selecting through the hundreds of article submissions we received in order to curate a diverse and thought provoking collection of articles that readers will get to enjoy.

The submissions you will soon read reflect the multidisciplinary nature of the Faculty of Arts and Science. The journal's focus stretches from solutions for improving maternal health in rural India to exploring the influence between gender identity and Autism Spectrum Disorder. As such, we thought a globe as our cover art was reflective of the volume's internationally relevant ideas.

Articles also discuss topics that are impactful and relevant to our current, and future, social climates such as body autonomy, mental health, racialized experiences, and the socio-economic impact of capitalism on the general public. We thank our authors for exploring these unique topics and choosing us to platform their important work!

We welcome inquiries and feedback from members of the Arts and Science and other readers who are curious for more insight.

Sincerely,

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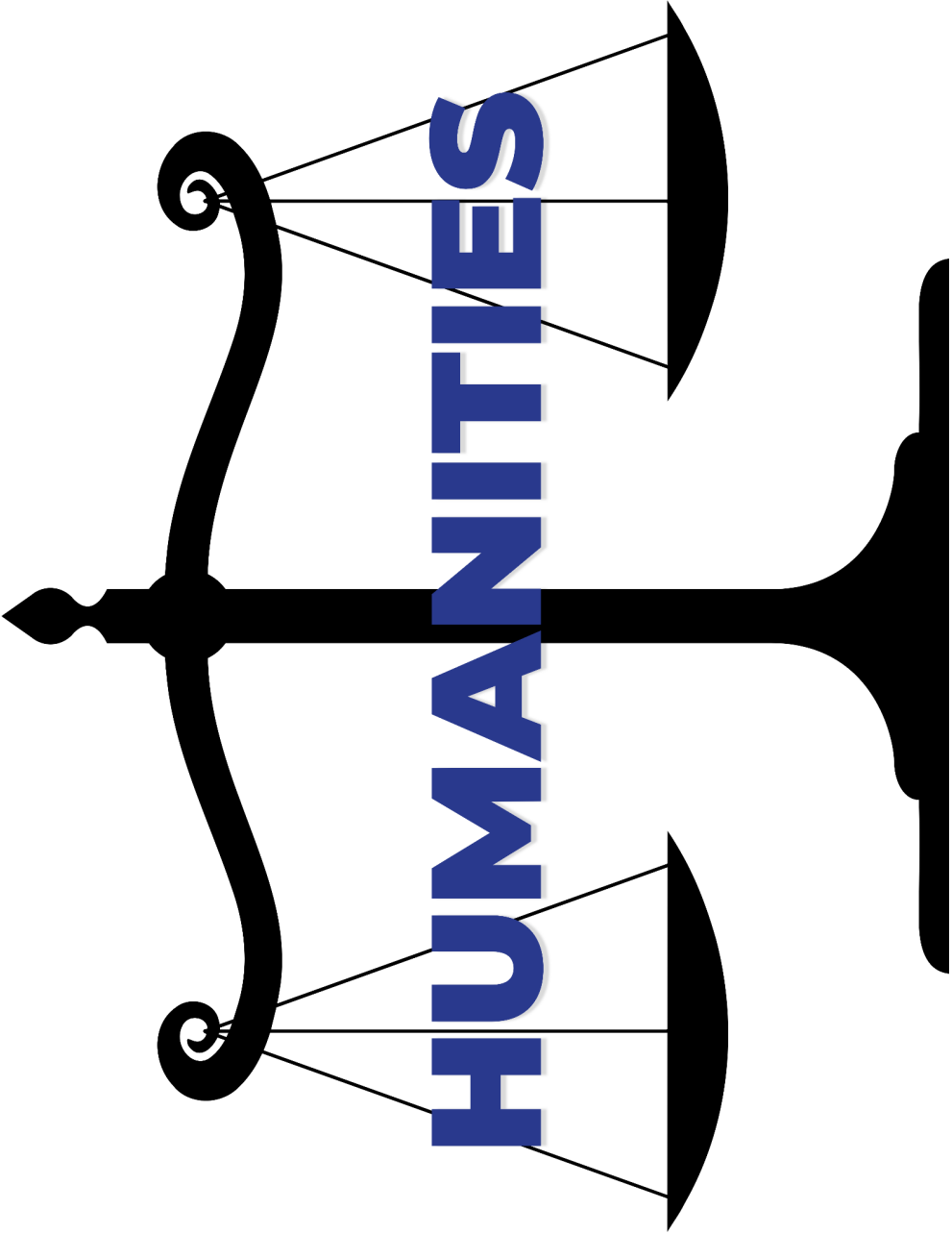
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Politics of Piety: The Role of Religion in Securing Citizenship for *Gens de Couleur* in Saint-Domingue

Lucy Stark (she/her) is a fourth-year History and Economics Double Major who specializes in French colonial history in the 18th century.

Following the fall of the Bastille in 1789 but preceding the onset of the Haitian Revolution in 1791, free people of colour (*gens de couleur*) in Saint-Domingue embarked on their own political mission to gain the same civil rights granted to White colonists within the French Empire. Led by educated, land-owning free persons, this group had grown accustomed to their social status as predicated primarily upon class rather than race. As White colonists cemented a racial hierarchy through segregation and legal discrimination in the second half of the 18th century, elite men of colour amplified their calls for equality. To retain the economic and social privileges they enjoyed up to the 1760s and fit within the homogenous nation-state envisioned by Revolutionary France, the *gens de couleur* augmented their shared cultural identities with White French society. One way of “whitening” themselves was through devotion to French Catholicism, demonstrated through religious rhetoric, alliances with Catholic priests, and public practices of piety.¹ Religion played an important role in buttressing the claims *gens de couleur* made to citizenship as their economic priorities increasingly aligned with the White planter class, thus convincing the metropole to formally enfranchise certain free persons of colour.

The first section of this paper relays the political imperative for *gens de couleur* to petition the French government for equal rights, namely the increasingly discriminatory colonial laws and the revolutionary ideology permeating metropolitan France. The second section of this paper will discuss the strategy of “whitening” one’s cultural identity to gain equal civil rights, particularly through Catholic connections. The final section of this paper seeks to reconcile the importance of Catholicism to the lives of *gens de couleur* and the relatively little attention they afford to it in their formal petitions to the National Assembly. Their greater focus on the economic and political advantages of granting them equal citizenship suggests that the

¹ The term “whitening” comes from Stewart R. King’s *Blue Coat or Powdered Wig: Free People of Color in Pre-Revolutionary Saint-Domingue*, in which he means that people of colour would use “military service... racial titles, proper behavior, patriotic values, and wealth” to align with the idea that “‘white blood’ – or cultural values – would overlay and suppress African and native American ones.” Stewart R. King, *Blue Coat or Powdered Wig: Free People of Color in Pre-Revolutionary Saint-Domingue* (Athens: University of Georgia Press, 2001), 119.

metropole was more interested in preserving slavery than simply maintaining Catholic solidarity.

Prior to 1760, wealth and land—more than race—determined one’s social status in Saint-Domingue (Garrigus 53). Julien Raimond, a prominent advocate for his class, exemplified the upper end of wealthy free persons of colour as he owned over 100 slaves on an extensive indigo plantation. In the middle of the 18th century, however, financially frustrated White colonists blamed upper-class *gens de couleur* for these poor economic conditions (Dubois 63-5). To maintain a semblance of superiority, the colonial government of Saint-Domingue imposed legal restrictions on these racialized elites, grouping wealthy and impoverished persons of colour under the same legal category. These laws sought to strip persons of colour of much that united them with White society, including civil rights. In a series of legislative reforms from 1758 to 1785, persons of colour were prohibited from owning firearms, wearing clothes that displayed wealth or White fashion, and having White-sounding surnames or noble titles. Public settings and occupations were racially segregated and persons of colour were not allowed to work in the fields of public service, medicine, or law (Reinhardt 107-8). In totality, these laws transformed Saint-Domingue from a society in which one’s social class was more important in determining one’s agency to one divided along the colour line. Unlike in Jamaica, there was no “special bill system” or another legal mechanism to secure one’s privileges as a wealthy, free person of colour in Saint-Domingue. Rather, when threatened by White colonists’ discriminatory legislation, *gens de couleur* like Raimond had to petition the metropolitan government for legal recognition of their rights (Garrigus 70-2).

These colonial petitions were brought forth in the midst of France’s dismantling of its own long-held notions of citizenship and equality. In 1789, the National Assembly published the “Declaration of the Rights of the Man and Citizen,” and unequivocally stated that all “men are born and remain free and equal in rights.” (Avalon Project). Despite these claims, the French Revolutionaries continued to exclude people of colour, Jews, women, and other minorities (Garrigus 237-40). As people of colour — including Parisian men from Saint-Domingue — pressed for enfranchisement, the Assembly had to reconcile its call for universal equality with its desire to maintain White supremacy. In claiming to represent a unified French nation, Revolutionaries feared that a diverse citizenry would undermine the nascent nationalism they constructed upon a foundation of homogeneity.

To fit *gens de couleur* into the Revolutionaries’ imagination of a racially and culturally uniform French nation, both free persons of colour and their White allies used the concept of “regeneration.” Regeneration broadly meant improving and recreating France after the overthrow of the corrupt

Ancien Régime but, when applied to people of colour, it was used to suggest that this racial minority could improve itself to properly uphold French citizenship. As argued by Abbé Grégoire – a Catholic priest and ally of *gens de couleur* – both Jews and people of colour should be given equal civil rights (Sepinwall 87-8). With these rights secured, these minorities could change themselves to prove their French identity. For Jews, this meant ultimately converting to Christianity. For people of colour, Grégoire advocated for intermarriage and reproduction with White colonists to both biologically and socially produce Whiter descendants (Sepinwall 91-7, 103-7).

While scholarship extensively describes how *gens de couleur* distanced themselves from the African-derived culture of enslaved persons and aligned themselves with the White, European culture of the French, there is less literature that specifically focuses on the Catholic aspect of these cultural leanings (Reinhardt 114-7). Specifically, there were three channels in which *gens de couleur* demonstrated their connections to Roman Catholicism: appeals to Christian egalitarianism, alliances with Catholic priests, and public practices of devotion. Each of these channels amplified their claims to be Frenchmen deserving of equal rights.

Harking on the Christian principle that everyone is made in the eyes of God and should be treated equally, free persons of colour highlighted a central underpinning of colonial French policy from its very inception (Peabody 90). In 1685, King Louis XV passed the *Code Noir*, which remained the governing decree on slavery throughout its colonies. With this foundational document, the French Crown asserted that Catholicism was the sole religion of its empire. By entangling its declaration of Catholic uniformity and supremacy with other articles which recognized the equal rights and citizenship of free persons of colour, the monarchy guaranteed Catholic egalitarianism: as long as one is legally free and religiously Catholic, one will be given the “same rights, privileges and liberties enjoyed by persons born free” (Louis XIV). Julien Raimond transformed this Christian ideal from religious sentiment to political strategy when he pointedly stated, “what earthly power can give itself the right to create unjust laws, when the Eternal itself has abstained from doing so?” (Dubois 60). Used to argue against the National Assembly’s exclusion of free persons of colour from the colonial legislature, Raimond’s logic required the supposedly democratic Revolutionary government to justify why, after the despotic *Ancien Régime* had upheld free persons’ rights, it was now revoking them. After passing the May 15, 1791 Decree, which allowed free persons (specifically, males born to free parents, owning land, over the age of 25) to vote and serve in the colonial assembly, the National Assembly substantiated its decision, asserting that the inalienable and equal rights granted by the *Code Noir* must be protected (French National Assembly 70-2).

In addition to using Christian egalitarianism to advocate for their civil rights, *gens de couleur* also aligned themselves with Catholic missionaries and priests. A prominent example of this collaboration is the relationship between Abbé Ouviaère and Romaine-la-Prophétesse. Both men were Catholic, but their religious articulations and personal backgrounds were widely disparate. Ouviaère was a White, ordained Catholic cleric from France who mainly used his priestly title to gain political clout, whereas Romaine was a free person of colour whose devotion to Catholic Marianism and self-identification as the godson of the Virgin Mary helped him amass religious followers from both enslaved and free populations in Léogâne. In 1791, Romaine led the Trou Coffy insurgency in which he and his followers took over the city, destroyed slave plantations, and killed or harmed many slaveowners. The Confederate Army—a group of elite *gens de couleur* fighting for their equal rights—sent Ouviaère to negotiate with the Prophetess and reestablish peace for the landowners who had been attacked. While Ouviaère acted largely to curb Romaine’s power, he also upheld him as “sober and brave” and on a “divine mission” (Rey 78-80). The mutual respect the two men held for one another demonstrates how Catholicism – even if only superficially practiced by one of the parties – bred a certain level of empathy and collaboration that cut across colour lines (Rey 46-8, 138-140).

These Catholic priests were also important mouthpieces for *gens de couleur* on the Parisian stage, as demonstrated by Abbé Grégoire’s petitions after the outbreak of the French Revolution. In asserting that “They [the colonial assembly] have vowed the degradation of several thousand estimable individuals, as if all were not children of a common father,” Grégoire used both Catholic and humanitarian guilt to sway the National Assembly (Grégoire 105-6). As White filters with a veil of religious authority, Catholic leaders amplified the same arguments posed by men like Raimond and Romaine – among others who did not have access to a public platform – but did so with the privilege that their white skin and French origins gave them (Rey 117-20).

In their religious practice, *gens de couleur* further elaborated their Catholic identity and indirectly substantiated their claims to “whiteness.” As White colonists reduced their acts of public devotion, *gens de couleur* remained steadfast in using Catholic formularies in notarized wills and marriage contracts. Furthermore, free men of color left bequests to churches, requested priests’ blessings on their deathbeds, sought burial in particular manners with reference to specific saints, and mentioned God in acts in which it would be unusual to do so (King 175-77). *Gens de couleur* also called upon their White priests to hold celebratory mass, *Te Deum*, after political victories (such as the passage of the 1791 decree of equal citizenship for free persons)

and alliance-making, demonstrating the centrality of religion in grounding political convictions (Johnson 54-5).

Despite Catholicism's prominence in the lives of *gens de couleur* through their political discourse, relationships to white priests, and their public practices, much of the literature neglects the religious elements of their campaign for equal civil rights. Instead, the discourse is dominated by the economic and political appeals used by *gens de couleur* and their allies to the National Assembly. The most important appeal was the call to preserve the institution of slavery. The predominance of the discourse that *gens de couleur* shared the economic interests and privileges of white colonists and would use their military force to suppress slave revolts suggests that it was not religious connections alone that won Paris' favor (Garrigus 83-5, 251). Rather, the National Assembly passed the May 15, 1791 Decree—enfranchising some free men of colour—in the face of increasing unrest in Saint-Domingue and calls for abolition (French National Assembly 70). While “whitening” themselves through shared religion benefitted free persons by attracting priestly support and signifying their respectability, it appears that French Revolutionaries were more concerned with keeping one class in chains by loosening another's.

Both *gens de couleur* and their White allies used these economic, military, and slavery-based arguments to appeal to the National Assembly's fears of losing its colonial 'jewel.' While they may have incorporated religious and moral convictions into their political petitions, many of the most prominent advocates on behalf of the free people of Saint-Domingue devoted a large portion of their writing to a central threat: if Paris does not allow *gens de couleur* to participate in colonial politics, they will shift their military and economic strength towards stripping the metropole of its major source of wealth. Even after Abbé Grégoire appealed to notions of justice, “a common father,” and the hardworking nature of *gens de couleur*, he ended his “Memoir in Favor of the People of Color or Mixed-Race of Saint Domingue” by arguing that they will provide a “mass of forces...more effective for containing the slaves,” once put on an even political playing field with White colonists (Grégoire 105-6). He restates this idea in 1790 when predicting that not only would oppressed *gens de couleur* stop protecting slavery, but they would also join White colonists to secede from France altogether (Grégoire 60-2).

There is also a clear pattern of anti-slavery sentiment in the *gens de couleur* and Catholic priests who did not receive White Revolutionaries' favor. Romaine-la-Prophétesse and Abbé Ouyière were both ostracized despite being Catholics: Ouyière was accused of encouraging Romaine's slave insurrection, and Romaine's anti-slavery movement placed him in direct

opposition to the priorities of both White colonists and metropolitan legislators (Johnson 144). Grégoire was also eventually labeled “counterrevolutionary” when he shifted towards an abolitionist ideology (Sepinwall 93). Thus, it was not shared religious identity alone that drew the line between the *gens de couleur* whom Frenchmen suppressed and those they supported, but rather how this identity informed one’s priorities towards slavery.

Furthermore, many of the *gens de couleur* themselves profited off of the slave economy and constantly reminded the National Assembly of this fact. One of Julien Raimond’s main strategies was to socially separate *gens de couleur* from enslaved persons in the minds of White Revolutionaries. By harking upon his family’s ownership of “seven to eight million in property in Saint-Domingue,” he ridiculed any assertion that his “intentions were to liberate all the slaves.” While Raimond stood out for his exorbitant wealth, *gens de couleur* owned a third of plantations and a quarter of slaves in Saint-Domingue (Reinhardt 107, 113). Vincent Ogé—another wealthy planter of colour and eventual organizer of the 1790 insurrection against the colonial assembly—also stated unequivocally that his “claims included nothing about the faith of the *nègres* who live in slavery” (Ogé 63-5). Rather than push for abolition, both Raimond and Ogé restricted their focus to “the class of free men who have been oppressed for two centuries,” conveniently omitting those whose oppression they profited off as both revenue sources and pawns for winning political privilege from the National Assembly.

In their response, the National Assembly largely mirrored that of the *gens de couleur* and their allies. While Parisian legislators justified the eventual equal citizenship to free persons for both economic and moral reasons, the predominance of the former indicates that this was not a fight won by shared religiosity. Rather, it was the financial threat of losing “the kind of agriculture that brings colonial prosperity,” such as sugar production through the use of enslaved labor, that led to this “urgent law of necessity” (French National Assembly 70-2). As a government that called for the protection of inalienable rights for all men, Revolutionary France dehumanized the enslaved by labeling them as “individuals of a foreign land” with “profound ignorance” (French National Assembly 70-2). Although the social connections that *gens de couleur* maintained with White French society were essential for supplying the National Assembly with a means to justify granting them equal citizenship, the racist, paternalistic language of arguing that enslaved persons’ freedom “might become equally dangerous for them (the enslaved)” merely served to distract from the real danger feared by the metropole: the destruction of a major source of revenue (French National Assembly 70-2).

The *gens de couleur* of Revolutionary Saint-Domingue were a heterogeneous group ranging from small peasant-farmers to wealthy plantation and slave owners, with a wide array of political, economic, and social interests. When threatened by colonial legislation which reduced the advantages experienced by the more economically prosperous free persons of colour, these elites responded through fervent assertions that *gens de couleur* were culturally White and deserving of equal civil rights. Catholicism was one part of this “whitening” rhetoric and it was demonstrated through both political petitions to the National Assembly and everyday practices of piety. However, the dominance of slavery-based discourse in both primary and secondary literature suggests that religion worked tangentially to economic appeals to assert the social equality of *gens du couleur* and their White counterparts. Ultimately, *gens de couleur* won limited enfranchisement by promising to maintain the institution of slavery in Saint-Domingue. Ironically, in the same year *gens du couleur* profited off of this promise, they found themselves united with the enslaved in their fight against the colonial state. As the Haitian Revolution emerged in late 1791, free and enslaved persons combatted a common oppressor but contended with different levels of subjugation (Garrigus 227-8).

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Sexual Assault and Intra-Racial Gender Relations in *Celia, A Slave and Beyond*

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The second-wave feminist assertion that ‘the personal is political’ is tragically portrayed in the events of *Celia, A Slave*. Though this book principally concerns the violent individual resistance that is Celia’s killing of her master, her act is motivated and precipitated by entrenched systems of institutionalised violence. The intersectional denial of Celia’s most basic freedoms, based on her simultaneous womanhood and Blackness, legitimises her lifelong dispossession and brutalisation. One might assume that the pervasiveness of this alienation can be best understood by examining the harm done to Celia by those individuals and structures to whom she was directly subordinate. However, it is more directly demonstrated by the maltreatment that she experienced from a supposed equal: her lover (and fellow slave), George. This paper will analyse Celia and George’s relationship within the context of gender relations and gender-based conflict among historical and contemporary African-American populations. Ubiquitous and legally-enforced sexual assault on plantations in the antebellum South posed a foundational threat to the stability of gender relations among slave populations. This instability has manifested in gender-based intra-racial tension which is still experienced in the modern era.

In order to understand the extent to which sexual violence impacted the lives of slaves in the antebellum South, it is informative to understand American slavery as a system of multifocal domination (Davis 457). Just as the institution was rationalised and enforced through formal White supremacy, it was — for much of its existence — made possible by male supremacy. Though slavery was abolished in the United States in 1865 (except as punishment for a crime), the legal importation of slaves was abolished nearly 60 years before. This reduction in the supply of slave labour rendered the controlled reproductive capacity of slave women a perceived necessity in perpetuating the institution of slavery (Davis 459). Slave women were denied sexual and reproductive autonomy as a result, being “coerced, blackmailed, induced, seduced, ordered and, of course, violently forced to have sexual relations with men” (Davis 459). In addition to their involuntary role in this sexual economy, slave women were often expected to provide sex to their master and/or his male family members. At some slave markets — so-called “fancy girl markets”— women were explicitly sold for the purpose of concubinage (Davis 459). It was this role in which Celia found herself.

Robert Newsom's purchase of Celia was not made for economic or practical reasons, but was chiefly motivated by his desire for a sexual partner. Rather than seeking a labourer to work in the house or field, he sought a replacement for his deceased wife (McLaurin 18). Immediately upon transporting Celia to his Callaway County homestead, Newsom committed the first in a long series of remorseless sexual assaults (20-1). These assaults would become a routine occurrence, and Celia would eventually give birth to at least one child fathered by Newsom (24). The extent to which his children were aware of the nature of his relationship with Celia is unclear, but it is apparent that this behaviour would have continued regardless of any moral disagreements his family may have had (28). Celia, reduced to the status of property and lacking even the support of her fellow slaves, could not stop this pattern of assault despite directly confronting Newsom (26). She had no legal recourse, as the state of Missouri considered the sexual assault of a Black woman to be trespass rather than rape (93). Even then, this charge was only pursued when a Black woman was raped by a man to whom she did not belong (93). Robert Newsom was "lord of the manor and could use Celia as he pleased," exercising legally legitimised White supremacy and male supremacy to force Celia to be his concubine (23).

The ever-present, legally enabled sexual exploitation of Black women ('the political,' as opposed to 'the personal'), as exemplified by Newsom's treatment of Celia, had disastrous ramifications on the intimate lives of slaves in the antebellum South. Being sexually assaulted is a profoundly traumatic experience, often leading to drastically reduced self-esteem, and chronic feelings of helplessness, rage, and fear. What is less immediately clear—though arguably as detrimental to gender relations among the slave population—is the extent to which this widespread assault caused community-wide trauma. Though male slaves were not in danger of being sexually assaulted, they were constantly exposed to the punishment, denial of agency, and sexual exploitation of their partners, sisters, and mothers (West 5). This reduced male slaves to a state of alienation, emasculation, and helplessness far beyond that which is to be expected in the service of unfreely performing unpaid labour (4).

These deeply felt psychological impacts caused rifts among slave populations, with many slaves taking out the aggression they felt towards their White masters and overseers on a more accessible population: each other (West 5). Perhaps the most direct example of this phenomenon is the documented evidence of the sexual assault of Black women by some Black men working as slave drivers in South Carolina (6). In the absence of personal freedom, these men leveraged their relative power, imitating the behaviours of their masters in an attempt to exert some degree of control over others.

Though this conduct on the part of Black slave drivers was not commonplace on antebellum plantations, it demonstrates an intersectional divide between Black men and Black women. When faced with a lack of control over their own lives, these particular Black men sought to exercise authority over the lives of their female companions.

It is through this lens that the actions of George should be examined. When, in the winter of 1855, Celia became pregnant with another child potentially fathered by Newsom, George threatened to end their relationship (McLaurin 25). George was aware that the nature of Celia's sexual contact with Newsom was exploitative and non-consensual, but still saddled her with the burden of stopping it (25). Confronted with his own structurally imposed inability to protect the woman he loved, George presumably felt great shame. His masculinity was foundationally threatened by the continued assault of his partner, so he lashed out through the only means accessible to him. Unable to confront Newsom without risking his own life, he exercised authority over the most vulnerable individual involved, informing Celia that "he would have nothing more to do with her if she did not quit the old man" (25) Seemingly motivated by this ultimatum, Celia confronted and eventually killed Newsom, and George subsequently implicated her in the murder and fled soon after in an effort to evade punishment (46).

George's conduct is difficult to rationalise on a personal level and seems to reflect a lack of mercy, sympathy, and responsibility. Though one could reasonably expect him to treat Celia with some measure of compassion, his actions seem to be driven by selfishness and resentment of his partner despite her exploitation. This disconnect can be partially explained by the involuntary confluence of 'the political' (viz. the external power of Robert Newsom) and the personal (viz. Celia and George's relationship). Like the South Carolinian slave drivers, George attempted to reassert the autonomy that had been stripped from him. In lieu of a rebellion, he imposed his will on a Black woman. This action was made possible due to her occupation of a social status even lower than his own.

The power dynamic present between George and Celia, as well as the South Carolinian slave drivers and their victims, is especially noteworthy because of its potential for contemporary application. Dartmouth professor Ella Louise Bell references the tendency of many male advocates for Black advancement to neglect the intersectionality of the issues they attempt to address, "putting sexism on the back burner" in the process (Bell 365). She refers to a hypothetical "Black Men's Club," which comprises the entirety of the Black male population of the United States. This 'club' ensures that the Black male experience is conflated with the broader Black experience in the context of political activism (366). Bell details the cases of multiple Black

women who were ostracised for their respective efforts to discuss sexual harassment in the Black community, including the authors Ntozake Shange and Alice Walker, as well as the professor Anita Hill (372). The backlash they experienced demonstrates a fundamental anxiety among members of the Black community that exposing the sexual violence of individual Black men would “provide the White power structure with ammunition that can be used against Black men” (372). In effect, this androcentric form of racial activism falls prey to the same power struggle informing the actions of George and the slave drivers. “The BMC...” Bell argues, “fulfills the need for them to assert their authority within the Black community because they are deprived of the full power of their masculinity within the White power structure” (366).

It is useful to compare Celia’s case study with both the broader historical record of gender-based tension among slave communities and literature regarding gender relations in the contemporary Black community. In doing so, the influence of legally enforced White and male supremacy upon individual and collective thought in the American Black community is clearly demonstrated. The story of Celia and George is one of stolen personal lives, depicting a woman systematically raped and denied social and legal rights, and a man forced under the threat of death to witness his partner experience these traumas and indignities. Analysing the social and economic roles of institutionalised sexual assault, as well as the mechanisms which allowed for its legal reinforcement, leads to a greater understanding of the political factors motivating this degradation of “the personal.” In examining the means by which George and the South Carolinian slave drivers attempted to resist their conditions of abject psychomoral alienation, one can perceive a trend towards reactionary authoritarian conduct based in fear and directed towards those of even lower social status than themselves. Finally, in comparing these trends with contemporary intersectional feminist literature, we can relate these psychological trends to modern events in both a personal and political sense. It is important to acknowledge the connection between conditions on antebellum plantations with intersectional shortcomings in anti-racist thought, as doing so can help to refute the notion that these patriarchal blindspots are inevitable. Anti-racism and feminism are not antithetical, and must be consciously mutually reinforcing.

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A Thematic Analysis of Men Assuming the Role of God in Classic Literature

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Patriarchal conceptions of God are present in classic literary works with, or in absence of, religious doctrine. The desire to assume God, expressed by Satan, Adam, Victor, and Robinson Crusoe, manifests into the obsession for mortal dominance. John Milton's *Paradise Lost* examines Adam's envy of Eve's ability to create, as well as Satan's jealousy of God's omnipotent supremacy. Likewise, Shelley's *Frankenstein* exhibits the God-like creation of life through Victor's character. Daniel Defoe's *Robinson Crusoe* utilizes its God-obsessed main character to establish rules and authority. Although from different eras, these three works share the hegemonic expectation that men be viewed as an ultimate God to those less powerful. This paper will demonstrate how these three works explore the masculine nature of assuming God in order to attain power through the means of creating life and law. This will be determined through various subtopics such as the examination of male judgment over minority groups, the entitlement to destroy and create life without endless empathy, and the obsession of male-oriented rule and law.

Milton's *Paradise Lost* is an epic blank-verse poem that explores creation in religiously patriarchal ways. Milton published this epic in the 17th century, when the tensions between republicanism and monarchy in England were revolutionary — he conjured this political and religious turmoil into commentary on the English people following blind prophets and beliefs. Indeed, Adam and Eve's Genesis story establishes male superiority and possessiveness over the perceived weaker sex. Adam claims ownership over Eve, seeing her submissive nature as territory to be claimed, explored in verses: VIII.484-587. Eve's existence, who is a "woman [...] of man" (Milton, VIII.496), is credited to Adam, as he asserts that she is the "[b]one of my bone, flesh of my flesh, my self" (VIII.495). Adam recognizes his creation, Eve, to be his caretaker, yet when she gains autonomy and independent knowledge, Adam resents her and states that she is "th' inferior in the mind" (VIII. 437-51 ; VIII.541). Thus, Adam, who is considered the first human, maintains his resentment towards Eve and her inherent ability to create without the assistance of divine intervention.

Similarly, Shelley's *Frankenstein* explores the theme of creation and ownership of an entity from a masculine perspective. Victor does not experience envy towards his female counterparts; his yearning to create life stems from his desire to become like God (Shelley, 47). The *Imago Dei*

(“Image of God”) is explored in this work when the Monster exclaims: “God, in pity, made man beautiful [...] after his own image; but my form is a filthy type of yours [...]” (Genesis 1:27 KJV ; Shelley 117). Frankenstein’s Monster was made in the reflection of man, ensuing in his “filthy” (117) and Godless likeness. “Satan had his companions [...]; but I am solitary [...]” (117) says the Monster, meaning that if Victor had not played God, the tragedies of the story would not have occurred.

The tribulations of *Frankenstein* originate from Victor’s denial to give the Monster a companion and save him from loneliness. Upon recounting his adventures, or misfortunes, the Monster demands a “companion [...] of the same species” (Shelley 130). In essence, the Monster would like a “female [...] with whom [he] can live in the interchange of those sympathies necessary [...]”, the same way Adam had Eve (131). Further connecting *Frankenstein* to the previously discussed text, Adam realizes that “For none I know / Second to me or like [...]” (VIII.406-407), and thus, God lovingly gives him Eve. With “Grace / in all her steps” and “Heav’n in her Eye” (VIII.488), Eve is a creation of the same species meant to compliment Adam. Yet upon the Monster’s ultimatum, Victor simply says “I do refuse it” (Shelley, 131). Unlike God — Victor, although intelligent, is not capable of God-like awareness, defined by seventeenth-century Brother Lawrence as an unconditional love unattainable to man, and that men can only “invent means and methods of coming at God’s love” (Lawrence, n.p.).

Likewise, Satan from *Paradise Lost* shares Victor’s ambition to embody God (Shelley 47). He believes he is a better version of God — one who simply creates and destroys his physical self at will, a feat Adam also pined for (VIII.484-587). Satan attempts to disregard God’s *substantia* to assume it himself, yet continues to feel indebted towards his Maker: “So burdensome, still paying, still to owe” (IV.54). Like Victor, Satan cannot quite mock the power of the Creator without consequence, despite his many gifts and followers.

In Defoe’s *Robinson Crusoe*, the titular main character does not assume God through synthetic biology like Victor; He plays God by manufacturing an ordered world. Crusoe “give[s] thanks to God” for his “blessings [...] in this forsaken solitary condition” (Defoe 111). Due to Biblical influence in the earlier half of the novel, Crusoe becomes the Creator and Destroyer of the island (111). Soon after, birds, or “thieves”, begin to eat his crops — and assuming the role of executioner, Crusoe shoots them (113). By “hang[ing] them [the birds] in chains” (113), he proceeds to claim the role of an almighty judge. By bringing forth justice to the land, Crusoe plays the role of a King; therefore becoming the closest mortal being to God (refer to the *Divine Right of Kings* (Zaller 1998)). Robinson Crusoe assumes various

roles and attributes typically associated with God, including that of a creator, destroyer, judge, and king, and does so through his actions on the island and his relationship with the world around him.

Crusoe becomes both a judge and executioner over the animals of the land, tasks that Adam and Eve, direct servants of God, manage in *Paradise Lost* (Milton, IX.205-7). Even so, by mirroring the first two divine beings, Robinson Crusoe's island mimics Eden, and in turn, Crusoe coronates himself to lead it. God's Creator status legitimizes his ability to form laws, as seen when Raphael explains the origins of Adam and Eve, saying: "Love / Our Maker, and obey him whose command / Single" (V.551-552). Thus, Angel Raphael achieves ultimate power with creation, resulting in praise and obedience from the Creator's Creatures. Likewise, Robinson Crusoe, the King of his presumed Eden, assumes ultimate creator status in a similar way.

By assuming White persons to be the original stewards of land, Crusoe sees the "savages" (Defoe 199), or Indigenous Peoples, on the island as a species worth saving. Initially, he subordinates Friday – Defoe's personification of the Indigenous peoples off of the Latin American coast – by teaching him to call him "Master" (119), resembling the God-fearing reverence Adam demonstrates by summoning the Creator as the "Author of this universe" (Milton VIII.360). Crusoe, in an act of self-proclaimed divinity, proceeds to convert Friday to Christianity by convincing him that his paganistic beliefs are a "fraud" delivered by "evil spirit[s]" (Defoe 201). This eventual power dominance over Friday demonstrates his (White) saviorism and ethnocentric views — a biased stance unique to human flaw (i.e., The Fall of Eve (Milton IX.781)). This series of events, then, does not occur due to a morally just God as Crusoe models himself after, but one acting on self-interest and preservation. Like Satan and Victor, Robinson Crusoe attempts to achieve God-like supremacy, yet lacks the compassion and partiality an omnipotent Creator should have.

Satan undermines the power of his Maker and tests what abilities of His can be recreated. "Better to reign in Hell, than serve in Heav'n" (Milton I.263) Satan boasts, yet this mentality is ironically his downfall. Satan makes the Underworld a "Heav'n of Hell, a Hell of Heav'n" (Milton I.255); This line promotes similar values to how Robinson Crusoe views the island as his paradise to rule. As the ruler of Hell — Biblically canonical (John 3:36 KJV) and in Milton's version — Satan attempts to overthrow Heaven by turning God's purest creations against their Creator, seen in the Fall of Eden (IX.990-1016). The entitlement towards other creatures also reflects Crusoe's ownership of Xury, a non-white boy who Crusoe later sells to slave-traders, and Satan removing Adam and Eve from "Eternal Providence" (Milton I.25-26). The exile from Eden parallels Crusoe selling Xury into slavery on

the condition of “[being] set [...] free in ten years if he turned Christian” (Defoe 38). Similar to Satan’s reign in Hell and Crusoe’s power over the island, corrupting the creation of life and order parallels Victor’s unnatural creation of the Monster, and like Satan, is an act of defiance against the presumed Creator (Shelley 117). Moreover, this continual trial of doubt placed on the Creator often results in the tragedy of external characters — demonstrating that the men in these works lack solicitude for other beings.

In essence, the relationship between Adam, Eve, and Satan explains the exploitation of creation and its unnatural repercussions. The three literary works analyzed in this essay uncover how envy towards a Creator — or of creation itself — is a masculine trait. The inability to create life without divine contrivance seems unfathomable, and to compensate, the characters investigated in this piece attempt to create life on their own. Thus, the characters defy the role of a Creator in their respective literature in favor of selfish-endeavors. By artificially assuming the role of God through creating arbitrary law, abnormal life, and earthly morals, one finds themselves in a deep abyss of tragedy.

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Something in the Way She Moves: Walking in Jane Austen's Novels

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If Henry Tilney considers “a country-dance as an emblem of marriage,” a walk together must be an emblem of seduction (*Northanger* 54). In Jane Austen’s novels, the limitations of the domestic experience are broken by her female characters’ daily strolls. By departing from the domestic sphere, the walking woman becomes a spectacle that attracts the male gaze. In fact, walking, or promenading, is often a conscious act of seduction staged by the Regency woman to encourage advantageous relationships and proposals. In Jane Austen’s novels, pedestrianism—an exertion of physical autonomy—functions as an exercise of feminine agency and autonomy. Women do not only serve as a public spectacle but also actively spectate other modes and forms of walking. Attractive male characters in Jane Austen’s novels are often praised for their manner of walking, which denotes their socioeconomic status as well as moral rectitude. The walking individual, regardless of gender, is simultaneously the spectacle for and the spectator of the opposite sex. As Mr. Darcy in *Pride and Prejudice* declares, an accomplished young woman must possess “a certain something in her air and manner of walking” (*Pride* 30). In *Emma*, the eponymous heroine urges Harriet to “[c]ompare Mr. Martin with [the gentlemen’s] manner of carrying themselves” in order to recognize the social inferiority of the yeomanry class to which Robert Martin belongs (*Emma* 27). Thus, pedestrianism carries romantic and sexual connotations for both sexes that allow individuals to indirectly assess each other’s marital eligibility before an open declaration of love and family alliance. In the romantic tangle of *Mansfield Park*, the characters are constantly “walking after each other” on the Sotherton Estate (83). Anne Elliot and Captain Wentworth in *Persuasion* reconcile their previous economic and social differences by taking frequent ambles in Lyme and Bath. Through these joint strolls, characters advance and solidify romantic relationships after a mutual exchange of socioeconomic information; female characters gain more than the nominal “power of refusal” in their ability to walk away from undesired attention, pursue the object of their affection, or walk alongside their love interest into the marital state (*Northanger* 54). For Austen’s heroines, walking on their own feet represents a form of romantic agency that aids them in the pursuit and realization of an affectionate—or at the very least, socioeconomically advantageous—marriage.

The moving female body is a seductive one. The physical benefits of exercise bring out “a bloom of full health” in the heroine (*Emma* 32). In *Pride and Prejudice*, Mr. Darcy remarks that Elizabeth Bennet’s “fine eyes” are “brightened by the exercise” (21; 27). Emma Woodhouse, a match for Elizabeth in physical vigour, is described by the doting Mrs. Weston as “the complete picture of grown-up health” (*Emma* 32). Even more incredulously, the hypochondriacal Susan Parker in *Sanditon* is magically cured of her various inflections and seen “walking and talking down a thousand difficulties” on behalf of the imaginary Mrs. Griffiths (335). While male characters also travel by foot in Jane Austen’s novels, such as the valetudinarian Mr. Woodhouse or the officious General Tilney, the salubrious effect of walking is mainly prescribed on female bodies as a marker of their femininity and eroticism. Indeed, the language of movement provides means by which Austen discusses the physical and sexual aspects of romantic relationships without piercing the veiled modesty of traditional courtship narratives.

At the same time, the wholesome influence of movement on appearances also relates to an individual’s mental tenacity against social and romantic disappointments. Jane Austen’s *Emma* describes its passive female character Jane Fairfax as “naturally so pale, as almost always to give the appearances of ill health” (156). Her “wan, sick looks” correspond to her inactive and ever-enduring attitude towards Frank Churchill’s insensitive and inappropriate behaviour in Highbury (348). In contrast, Emma “resolve[s] to be out of doors as soon as possible” after mistaking Mr. Knightley’s affection for herself as feelings for Harriet Smith (333). Similarly, Anne Elliot’s waning beauty and disappointment are alleviated through frequent strolls and activities. In fact, her lost “bloom and freshness of youth” is “restored by the fine wind which had been blowing on her complexion” during a walk (*Persuasion* 87). For Austen, mental resilience against romantic obstacles is expressed and achieved through walking out of doors, demonstrating a desire to move forward despite momentary setbacks. Health complexions, in contrast to the sickly hues of Jane Fairfax or contemporaneous Gothic heroines, symbolize female power and virtue.

For women, walking constitutes a performative act meticulously staged for male attention. In *Pride and Prejudice*, Miss Bingley proposes a walk around the drawing room with Elizabeth arm-in-arm to garner Mr. Darcy’s notice, prompting him to jest that the pair must be “conscious that [their] figures appear to the greatest advantage in walking” (43). This scene of mutual observation places Elizabeth and Miss. Bingley as conscious spectacles observed by an equally cognizant spectator. In the Pump-room of Bath, Isabella Thrope, well-versed in the matter of romance and seduction,

“parade[s] up and down” the public space with Catherine as her shield against accusations of immorality (*Northanger* 14). The seductive connotation of walking is emphasized by Austen’s substitution of “walk” for a much more theatrical term, “parade.” Isabella Thorpe understands that “she must sell herself” through “capitalist self marketing” in the marriage marketplace to achieve social and economic stability as a dependent woman (Zlotnick 282; 279). Susan Zlotnick reads the various women in *Northanger Abbey* as figures deeply entrenched within the growing marketplace culture in Bath. The commodification (and selling) of the female body offers “more assertive forms of agency than the mere right of refusal” (279). Indeed, it offers the possibility of female choice and pursuit, however covert. Nevertheless, despite the commodified sensibility of the public, the marriage market is still a space “regulated by specific rules of decorum, brokered by institutions and protected by laws governing property” (Bermingham 97). While Isabella parades herself as a commodity in Bath, her purely material aspirations doom her attempts to marry upwards.

As a seductive act, walking is often performed by single women as an indication of their availability in the marriage market. The language of courtship indicates that a young lady who is “out” is removed from the privacy of childhood and domestic spaces. She is subsequently exposed to society in public spaces and events where she is seen walking, dancing, and forming romantic associations. Indolence is typically reserved for married women such as Mrs. Bertram of Mansfield Park or Anne Musgrove of Uppercross, who is vexed by her reputation as “not a very good walker” (*Persuasion* 71). The social stability provided by the marital state renders movements outside of the domestic space unnecessary for these women.

In fact, married or engaged women that frequently participate in public walks and strolls often expose themselves as unfaithful partners. The promiscuous and bankrupt Lady Susan is constantly “strolling along the Shrubbery,” “pac[ing] the Shrubbery,” and “walking ... in earnest conversation with Reginald” (*Lady Susan* 211; 212; 214). In her essay, Sally Palmer argues that walking “performs a host of social functions, all aimed at expanding women’s options” (157). Yet, she fails to address that by broadening the woman’s social horizon, the same woman is inevitably subjected to moral implications. While a woman can enrich her socioeconomic status through marriage, she can also walk into sexual immorality through the unscrupulousness of her conduct. By walking with Reginald in an open garden, Lady Susan purposely exposes herself to her sister-in-law’s unsavoury conjectures and speculations, recognizing that walking alongside the opposite sex is often seen as a precursor to an engagement. Isabella Thorpe’s frequent parades in public spaces foreshadow

her unfaithfulness to James Moreland in *Northanger Abbey* as the continual display of her feminine figure denotes her flirtation with other suitors. While she maintains the apparent modesty of an engaged woman by pronouncing it “odious to parade about the Pump-room” with Catherine, her immobility is brought on by her desire to converse unrestrained with Captain Tilney (*Northanger* 106). In listing her reasons for sitting still, the narrative slips into free indirect speech, creating an objective distance between Isabella’s excuses and the reader. Her exaggerated proclamation that she is “amazingly tired” and finds walking “odious” exposes her insincerity and propensity to infidelity (106).

In *Sanditon*, Charlotte learns of Sir Edward’s deficiencies when he “quit[s] Clara immediately on their joining and agree[s] to walk” with her (*Sanditon* 321). His abandonment of Clara and proposal of a joint walk with another woman instantly expose him as a mercenary. As Charlotte comes to the realization that his intent is “to pique Miss. Brereton,” any romantic sentiments surrounding Sir Edward are dissipated by his weaponization of walking (323). The subtlety of Austen’s language exposes the power imbalance inherent in social interactions between men and women. While Sir Edward is “chusing to walk with [her],” Charlotte is robbed of the same choice and strong-armed into the partnership by the rules of social decorum. Sir Edward’s exploitation of commonplace politeness, similar to John Thorpe’s Gothic oppression of Catherine Moreland, indicates a character shift toward immorality and villainy. Walking, for both Lady Susan and Sir Edward, is a tool of manipulation to garner jealousy and further their romantic endeavours with the chosen victim. In Austen’s novels, travelling on foot often carries subtle and minute implications of social and sexual morality. It is the responsibility of its characters to navigate through the rules and decorum that govern these peripatetic pursuits.

Men are not fixed spectators in Austen’s novels but become spectacles themselves by walking. Catherine Moreland in *Northanger Abbey* perceives Henry Tilney in a crowded ballroom as he is “moving that way” towards her (36). Since Tilney “d[oes] not see Catherine,” she is able to recognize that he is “as handsome and as lively as ever” (36). In this instance, the power of observation is reversed; it is Tilney who must submit to the scrutiny of the female gaze. The use of relational deixis within this scene of perception indicates that Catherine must be the spatial and deictic centre from whom these impressions originate. Her assessment of Tilney leads her to “the instant conclusion” that he “could not be married” (36). Just as women walk through social spaces to indicate their unmarried state, men can also announce their romantic status through the manner of their walk. Emma Woodhouse first notices Mr. Knightly’s attractive qualities through the air of his movements.

She informs Harriet that “Mr. Knightley’s air [of walking] is so remarkably good that it is not fair to compare Mr. Martin with him” (*Emma* 27). While many critics have commented on Emma’s “sexual peculiarity” in her resolve to never marry, her consciousness of Mr. Knightley’s walk implies that she is not impenetrable to sexual desires. Mr. Knightley’s “downright, decided, commanding” nature is reflected in his walk as he “always move[s] with the alertness of a mind which could neither be undecided nor dilatory” (25; 303). Feminine agency becomes more apparent than ever in *Emma* when Emma and Mr. Knightley observe each other at the Weston’s ball. During her dance, Emma is conscious that “[Mr. Knightley seem[s] often observing her” (256). Looking back, she sees that “[h]e moved few steps nearer” (256). Emma’s ability to return the male gaze demonstrates that “she is not sexually submissive to and contingent upon men” (Johnson 123). Just as she is constantly observed by Mr. Knightley, she is simultaneously exerting her own right to choose a romantic partner.

Socioeconomic compatibility is imperative for a happy marriage. The way a character walks determines the circle they move within. On their daily stroll through Highbury, Emma and Harriet encounter Mr. Martin, permitting Emma “an opportunity of survey[ing] the couple as they walk side-by-side” (*Emma* 25). This brief occasion for observation leads Emma to repudiate Robert Martin’s “entire want of gentility,” causing Harriet to announce that “[Mr. Martin] has not such a fine air and way of walking” (26; 27). The world of *Emma* is “an orderly society whose inhabitants ‘clearly understood’ the ‘principle of social stratification’” (Hume 59). The fear of social mobility through marriage leads to the scrutinization of one’s physical mobility. Thus, Robert Martin’s simple gait convinces Emma that “The sphere in which [Harriet] moves is much above his” (*Emma* 50). Moreover, the spectacle of the walking individual is often reserved for those of equal or compatible socioeconomic status. The “very well judging” Robert Martin “look[s] very respectfully at Emma” as his social superior while he “look[s] with the most unfeigned satisfaction at [Harriet]” (48; 26). In contrast, Emma and Harriet both mistake Mr. Knightley “walking with [Harriet] apart from the others” (322) as a sign of his interest. Emma’s false presumption of Harriet’s “illustrious” family history misleads both to believe that a union between two social unequal can be signified by walking together. Instead, the walks perform no other function than to establish a paternalistic relationship between the landlord and his tenant. Ironically, physical mobility does not signify Austen’s endorsement of total social mobility.

Under the restriction of Regency society, walking becomes the means by which women can bring about romantic relationships. As Claudia L. Johnson points out, “bullying of various sorts is rampant” amongst the

masculine figures of *Northanger Abbey* (Johnson 36). The “feminine power of refusal” is often ignored or trampled upon (36). Catherine Moreland’s resistance to the Thorpe’s Clifton scheme is repeatedly invalidated by John Thorpe’s deception and presumption in speaking for her with Eleanor Tilney. John Thorpe’s tyranny aims to sabotage her relationship with the Tilneys, specifically Henry Tilney, and attempts to rob her of any romantic agency. However, later on, rather than submitting to his tyranny any further, Catherine sets off in pursuit of Eleanor Tilney to rectify the mistake and “almost r[uns] over the remaining grounds till she gain[s] the top of Milsom-Street” (*Northanger Abbey* 73). The narrative here switches into free indirect thought, with Austen exerting her authorial judgement to affirm the propriety of Catherine’s chase. She is doing “what [is] due to others, and to her own characters in their opinion” (73). The “moral and physical coercion of powerless females” that runs rampant in Gothic fiction is subverted by Catherine’s walking endeavour (Johnson 37). The heroines of Austen’s novels interject female agency by walking themselves into the proper physical and moral positions for an advantageous match.

The daily ritual of walking is complicated by its social, sexual and economic implications for women in Jane Austen’s novels. Walking functions as a spectacle for the male audience that points to the woman’s readiness and compatibility for marriage. In exchange, male characters walk across public settings under the observation of eligible women. Through these mutual acts of observation, characters assess each other’s appearances, manners, socioeconomic status, and moral rectitude. By returning the male gaze, walking grants heroines the romantic agency that they often lack in contemporaneous Gothic novels and even reality. The heroines of Austen’s novels can walk themselves into a desired union or away from an undesirable situation. As the constant advocate for temperance, excessive walking can also be an indication of hyperactive sexuality that strays into lechery. It is only through a balance of self-sovereignty and self-restraint that the female characters walk into a mutually agreeable partnership.

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Re-examining the Debt-Creditor Relationship: The Transformative Value of Debt

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A shift in economic relationships informs a shift in our social relationships. In his book *The Making of the Indebted Man*, Maurizio Lazzarato argues that today's neoliberal economy is a debt economy and has radically shaped our relationship with ourselves, others, and our social institutions. Within the framework of the neoliberal economy, debt has become more central in the making of our economic and social lives. It is the "indebted man" that emerges from this framework that "makes up the subjective paradigm of modern-day capitalism," and this new paradigm has profound limitations to our agency (Lazzarato 38). In this essay, I argue that how we conceive the debtor-creditor relation upon which our social relationship is established informs our capacity to behave and imagine our shared future. Following Lazzarato's account of the implications of the debt system, I argue that a different conception of debt can engender a radically different ethical relationship between individuals, social institutions, and non-human entities. I will then turn to Kyle Whyte's work and argue that the ancestry-progeny relationship can be seen as a debtor-creditor social relationship that can enhance our agency to make emancipatory changes by establishing a reciprocal relationship between ourselves and future generations.

With the series of financial crises, it is the "indebted man" that is the subjective figure of capitalism as opposed to the "man" of "mobilization, engagement, and activation of subjectivity through the techniques of business management and social government" that was promised by neoliberalism (Lazzarato 37-38). People today carry the weight of their debt instead of possessing the agency to act freely in a market society. For Lazzarato, debt is not only a liability, but the motivating force that constrains and produces the individual: "debt breeds, subdues, manufactures, adapts, and shapes subjectivity" (39). Individuals have to structure their ethics, lifestyle, and personal choices as a result of their debt: it "makes up the subjective paradigm of modern-day capitalism" (Lazzarato 39). Debt is able to play such a dominant role because it informs social relationships—contracts between two or more parties—that produce a power differentiation between the debtor and the creditor. This power difference shapes the relationship between oneself and other individuals, social institutions, and time.

This new social relationship constrains one's future. In the most fundamental sense, to undertake a relationship of debt/credit means the promise of a future payment. This relationship produces a person who is capable of promising—"someone able to *stand guarantor for [themselves]*"—and thus allows the individual the capacity for memory—"a memory of the future"—and, more importantly, with "a conscience," which inscribes morality in the person in order to keep them from forgetting (Lazzarato 40). Lazzarato further points out that this memory is insufficient to make a person remember their debt. Corporal punishment and shame are necessary elements for creating a person capable of promising and fulfilling their debt obligations: "the performative of the promise implies and presupposes a 'mnemotechnics' of cruelty and a mnemotechnics of pain, which, like the machine of Kafka's penal colony, inscribe the promise of debt repayment on the body itself" (Lazzarato 40-41). The debt obligation also makes the debtor predictable because the failure to repay debt results in moral condemnation (Lazzarato 42).² Accordingly, the debtor must make themselves into a "calculating animal" who must be "predictable," "answerable," and "calculable" to the creditor and the future repayment of their debt, further limiting their freedom (Lazzarato 42-43).

More crucial is debt's effect on temporality. The indebted person must be made answerable and structure their behaviour according to the debt they have to repay. However, it is also true that the future is full of uncertainty. Debt operates as a mechanism that "neutralizes" time by making the debtor oriented toward their debt (Lazzarato 45). In so doing, debt reduces or eliminates the risk inherent in an unpredictable future by forcing the debtor to act with certainty and continuity, to "establish equivalences between current and future behaviour," and thus reduces time to the mere calculation of interests and risks (Lazzarato 46). This discipline of the future reduces all possibilities of novelty. The future must be neutralized, "bridging the present and the future," and owned for the repayment of the debt and the "reproduction of capitalist power relations" (Lazzarato 46). For example, indebted students and homeowners must demand certainty, stability, and financial equilibrium and will most likely reject sudden changes that disrupt their life, not as a result of their presupposition of what a good life is but as a result of their future-oriented memory made years ago when accumulating a debt. The debt system must reduce or eliminate the risk inherent in time, for the future of individuals as well as society. For Lazzarato, this neutralization

² "When it comes to talking about debt, the media, politicians, and economists have only one message to communicate: 'You are at fault,' 'You are guilty.' The Greeks laze about in the sun while German Protestants slave away under gloomy skies for the good of Europe and humanity." (Lazzarato 31).

of time is profoundly restrictive—“[possessing time] in advance...means subordinating all possibility of choice and decision” to the maintenance of the status quo (46). This neutralization of time—“the tautology of money making money, of production for the sake of production”—stifles change and thus undermines human agency and potentiality, and the possibility for change (Lazzarato 48-49). Further, Lazzarato criticizes that this “tautology of money making” perpetuates a state of stasis because it becomes increasingly important for social institutions to neutralize time to avoid uncertainty as more wealth gets amassed in banks (48).

Moreover, debt converts virtues and passions into mere measurements of a person’s credibility, alienating our emotions’ potential to create new possibilities. For Lazzarato, radiant and positive human affects and emotions are crucial for creative actions, whereas “fear, sad affects and passions serve to neutralize the power to act” (71). For example, the virtue of trust, of “noble sentiment toward oneself, others, and the world,” which originally could act as a motivating emotion to bring about new collective possibilities, is now reduced to “a trust in solvency and makes solvency the content and measure of the ethical relationship” (Lazzarato 58). Trust is no longer the promising relation between one and the collective but a top-down assessment to measure individuals’ capacity to repay their debt by financial institutions. It presupposes in others “a preliminary distrust, since the other person is a rival, a competitor and/or a debtor” (Lazzarato 57). This lack of trust in others undermines our capacity to make changes because our power to act depends on our energy to act, and this energy depends on our trust in one another—and ourselves—as people with common interests as opposed to a competitor and/or a debtor (Lazzarato 67). Meanwhile, incapacitating human emotions, such as anger, frustration, and depression, emanate from the burden of debt, and these emotions, too, under the dominion of the debtor-creditor relationship, undermine people’s spiritual and emotional foundation upon which new possibilities are conceived and built (Lazzarato 71). According to Lazzarato’s account, the debtor-creditor social relationship reduces people’s capacity to act and create novel ideas and innovations that could upend existing social relations outside of the logic of debt through the constant reminder of punishment—a sense of dread that if they forsake the debt, they will face punitive consequences.

However, we can read Lazzarato’s observation that debt produces an indebted person in a positive light by considering Whyte’s account of Anishinaabe’s (Neshabé) ancestry-progeny relation. I formulate Whyte’s ancestry-progeny relation as a debtor-creditor relation that attends to both histories and futurities, and shows how it can be instrumental in our reconceptualization of the “indebted man.” Through this reading, I expand our

conception of debtor-creditor relationship and include the consideration of nonhuman entities as well as our ancestors and offspring. By imagining a new form of debtor-creditor relation, I argue that we would develop a different conscience, one with which we engender a set of cultural norms, social and political institutions, and emotions different from those that emerged from Lazzarato's conception.

According to Whyte, Anishinaabe's understanding of ancestry-progeny relations requires the current generation to adopt a cross-temporality relationship with their ancestors and the future generation (160). The current generation must take up the standpoint of themselves as the future ancestor of the next generations "guided by our reflection on our ancestors' perspectives and on our desire to be good ancestors ourselves to future generations" (Whyte 160). It is in this way that we derive ethical and political motivations to protect, preserve, and enhance the necessary material and natural conditions of our world in order for future generations to benefit. After all, without the previous generation's attentive care for the condition of the world, our generation would not have existed. In this way, our ancestors and future generations confer a debt on us. This debt would make demands for us to shoulder our ancestor's responsibility to continually protect and cherish our world so our future generations may enjoy it. However, it is important to note that we are not making any contractual promise to anyone that entails severe punishments if we fail to pay this debt. Rather, we make a promise solely to and with ourselves. This 'self-promised' debt engenders a reciprocal relationship (between humans and entities/necessities that make us flourish) enshrined by us and under which we feel indebted when we benefit from and depend on others (our ancestors as those we depend on) and other nonhuman entities (nature, for example).³

We can also conceive a 'self-promised' debt by viewing ourselves as enjoying the benefit of our ancestors' efforts. On the one hand, we are not indebted to our ancestors because they *are no* longer here, and we cannot repay their debt to them. On the other hand, we *are* indebted to our ancestors, but we can only pay our debt to them by "returning the gift" to our future generation by protecting relationships of interdependence (Whyte 160). This is because the ancestry-progeny perspective makes us acknowledge that the condition of this world is a product of our ancestors, and this debt that we carry forward embodies an intonation of gratitude in which we feel obliged to pass on just so that we do not forsake our ancestor's efforts for their future generation (Whyte 130). When we repay our debt forward, we do not see

³ Whyte notes that there are "many different relationships connecting human and nonhuman living beings (plants, animals, persons, insects), nonliving beings and entities (spirits, elements), and collectives (e.g., forests, watersheds)" (126).

ourselves as a creditor, but we merely see ourselves repaying our debt to our ancestors.

While our debt to our ancestors may be rendered void if our generation inherits a disastrous world (due to our ancestors' lack of care), our obligation to preserve and enhance the world is not diminished not only because we need to be good ancestors ourselves but because of our recognition of the instrumental and the intrinsic values of other nonhuman entities that make up the interdependent and reciprocal relationships that sustain us. From the Anishinaabe's perspective, protecting the environment is instrumentally good (Whyte 127). Since humans are an integral part of the ecology (the system of interdependence), protecting the environment and ecology also sustain our biological existence (Whyte 127-128). In this respect, by being in an interdependent relationship mankind is no longer unique in standing above nature; other entities are equally intrinsically valuable—deserving to be respected as a part of the ecology that sustains us—and also forms a debtor-creditor relationship under which we must respect and protect their wellbeing (Whyte 127).⁴ We can thus develop systems of responsibility by creating “complex social, cultural, economic, and political institutions” that require constant adaptation and recalibration to maintain a good condition for all entities to thrive (Whyte 128).

Furthermore, paying forward this debt does not always require us to be predictable and calculable; rather, this debt calls for active change and innovation. If we understand our indebtedness as the gratitude we give to our ancestors and the necessity to do good for our offspring, we are animated by consciences to do good that preserves and enhances the interdependent relationship with other beings and entities. Because we live in a world where the future is uncertain, our debt responsibility would oblige us to be not only responsible but fluid, active, and responsive to emerging needs that our future generation will, too, be thankful for. As such, the ‘self-promised’ debt cycle continues forever. Accordingly, we are a radically different “indebted man” than Lazzarato’s conception. The new debtor-creditor relationship develops the responsibility for “reciprocal expectation,” which demands the adoption of a set of social, political, and ethical responsibilities that best serve the thriving interdependent relationship with other entities (Whyte 128). Thus, this debtor-creditor relationship develops a conscience—radically different from the conscience developed under the neoliberal market—through our

⁴ “The concept of interdependence includes a sense of identity associated with the environment and a sense of responsibility to care for the environment. There is no privileging of humans as unique in having agency or intelligence, so one’s identity and caretaking responsibility as a human includes the philosophy that nonhumans have their own agency, spirituality, knowledge, and intelligence” (127). The violation of this relationship would constitute a form of environmental injustice.

appreciation of others' existence, of those who have come before or the ones existing in the present.

More importantly, if we accept the 'self-promised' debt, we are animated not by fear of punishment but by our gratitude for our ancestors and other nonhuman entities without which we cannot survive and flourish. Once we internalize this new concept of the "indebted man," we become more aware of our vulnerability and our indispensable dependence on other entities and our ancestors. The 'self-promised' debts infuse positive emotions in us (empathy, love, humility and respect, etc.) as well as emotions that prompt us to act in cases of injustice. These emotions are active and can enable us to animate collective action in the face of challenges to address persisting and emerging demands.

In embodying this new debt, we are actively informing ourselves that we need to cherish and value others because we know we are interdependent with entities that support our well-being and that we have to fulfill our ancestor's debt. And, in cases of injustices toward the system of interdependence and reciprocity, we will feel obliged to direct our active emotions into concrete actions that will help address any harm and injustices. In this way, our capacity to make changes is enhanced and strengthened by our gratuitous indebtedness toward others that form our interdependent system and our ancestral efforts that made our current generation possible.

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Fantasies as Revolution in *Peking Opera Blues*

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“Don’t be sad. We’ll see each other again. After the revolution, we’ll meet in Peking.”

-Tsao Wan’s parting words, *Peking Opera Blues*

Tsao Wan utters this promise at the end of Tsui Hark’s 1986 film *Peking Opera Blues*, moments before riding off into the sunset. She has accomplished her goal and obtained the documents necessary to prove her father’s corruption, but now comes the time to leave the friends who helped her do it and continue the revolution that has only started. Her promise raises a question: what can be done with the unknowable, or the amorphous future before us? Sedgwick opens her essay “Melanie Klein and the Difference Affect Makes” with a passing thought: “Sometimes I think the books that affect us most are fantasy books” (625). She goes on to define a fantasy book as one never read, but spoken about and impressed on the mind. Sedgwick presents this not as a claim or an objective truth, but as an observation deeply rooted to her self-perception. She thinks of this fantasy, but only sometimes. It is with this concept of fantasy that I approach *Peking Opera Blues* and the fantasy of revolution that lingers throughout the film. Though the main cast consists of revolutionaries and those looped into their plans, the film avoids talk of grand ideals and large-scale goals for the revolution. Instead, what the revolution *could* result in gets left to the imagination. Though the film’s retrospective setting means the viewer likely has knowledge of the outcome of the Chinese Revolution, *Peking Opera Blues* captures the aspiration that comes with facing an uncertain future. When what is to come is unknowable, the possibility for something new opens up. From the present’s perspective, *Peking Opera Blues* performs a reparative reading of the revolution by focusing on imagining new ways of organizing society through ephemeral relationships between the three women.

Peking Opera Blues takes place in early 20th century Beijing, where military officials, ostensibly under the same government, vie for power and control. Tsao Wan, the tomboyish daughter of General Tsao, a corrupt man who takes bribes from foreign interests, seeks to prove her father’s misdoings with the help of revolutionaries. Their quest brings them to an opera house, where travelling musician Sheung Hung and the theatre owner’s daughter Pat Neil find themselves united in their aims. Together, they attempt to steal a set of documents proving General Tsao’s collusion and stoke the ongoing

revolution. Generically, *Peking Opera Blues* combines Hong Kong martial arts cinema with comedy and political intrigue, but much of its plot focuses on the growing friendship between the three female heroines. In doing so, I argue that the film takes up the depressive position. In “Paranoid Reading and Reparative Reading, Or You’re So Paranoid You Probably Think This Essay Is About You”, Sedgwick argues that seeking pleasure through the depressive position marks a shift from the self-defeating strategies of the paranoid position (137). By focusing on their relationships to one another, the film takes up positive affects, and uses the love shared between the women to engage in world building retroactively, focusing on possibility rather than the actual outcome of the revolution.

After escaping a failed assassination at the Peking Opera House, the three heroines spend a night in the lavish living space of General Tsao’s abode. Tsao Wan dresses her two friends in elegant nightgowns she used to wear before living abroad in Europe. The gauzy white fabric glimmers amidst the room’s polished and pale decor. The crystal wine glasses, the gleaming record player, and the baskets full of grapes all attest to the wealth gained through General Tsao’s corruption. Rather than wallowing in their failure to carry out the heist, the women bask in the light from the hearth and enjoy each other’s company. At first glance, the scene’s decadence seems to contradict the revolutionary aims of the women. The food, drink, and comforts they revel in all come from General Tsao’s corruption and their continued failure to usurp him. However, the focus on pleasure and the joyful experience shared between the three women foregrounds what the unfinished revolution has already provided—a deep connection between women who are all othered in various ways. The detour from narrative progression, as well as a progression towards their goals, enacts a reparative strategy by valuing the moment of pleasure the three women share together. As important as exposing General Tsao’s corruption is strengthening their bonds with one another and celebrating the moments where they can imagine what their lives will be like once they achieve their goals.

By looking at maps, the women reimagine their lives in Beijing. The three women abandon their food to huddle around a globe, pressing their faces cheek-to-cheek as they inspect the map of China. At the heart of the film, literally within the centre of the plot, lies three women attempting to find themselves on the map. They make space for themselves in the representation of Beijing, which Pat Neil and Sheung Hung notice only appears as a dot. The ensuing debate over whether they should run away or make a life for themselves within that dot shifts the focus of their revolution from establishing national boundaries and towards the goal of making space for their connections. In doing so, they consider the nature of their own position.

A position can be a physical point in space, such as the Peking Opera house where much of the film's action happens, or a frame of mind. The film's English title, *Peking Opera Blues*, revels in the same depressive position the women are up against. While the original Chinese title translates to English as *Knife Horse Actresses* in reference to the male actors playing female warriors in opera, the English title focuses on the site of performance rather than the performers themselves. The blues captured in the film directly correspond to the historical moment in a particular place. To think about the physical locations of a reparative position involves a consideration of the people who take them up. In *Peking Opera Blues*, the female revolutionaries are queer in the way that they lack anchor points to a physical space, whether that be the nation or the stage.

How can we anchor queerness in space when it is tied to transience? In the case of Tsao Wan, who has travelled the globe and returned to Beijing to join the revolution in her homeland, her physical position is ever changing, or simply ephemeral, untraceable. In accordance with Muñoz's account of ephemera, Tsao Wan's indulgence in decadence with her friends stands as evidence for the possibilities of revolution. Jose Esteban Muñoz, in his piece "Ephemera as Evidence: Introductory Notes to Queer Acts" argues that "various performances of queerness stand as evidence of queer lives, powers, and possibilities" (6). Reparative positions within *Peking Opera Blues* go beyond the stage, but performance takes up the revolution. Tsao Wan explains her decision to dress in men's clothing to move more freely while living abroad. Her dress, and the lies she tells her father to hide her revolutionary nature, signify her existence within the depressive position and the work she undergoes within it. The battles staged within the opera compound on top of the battles between the revolutionaries and the likes of General Tsao. Performance becomes the place where the women build a new world where they can exist outside of the limits of their society.

In order to continue with reparative strategies, *Peking Opera Blues* dissolves the division between the stage as a place of performance and elsewhere as a place of truth. The division between performance and relation forces a binary form of rigour much like that of the state the characters seek to overthrow. Muñoz examines the ways in which queer performances, in all of their capaciousness, revise standards of critical analysis obsessed with rigour (7). The academic rigour imposes a clean speak that Sedgwick describes in her account of the paranoid position, which splits "both its objects and itself into very concretely imagined part-objects that can be only seen as exclusively, magically good or bad" ("Melanie Klien and the Difference Affect Makes" 633). To read *Peking Opera Blues* in line with a history of academic rigour and from the paranoid position would involve a greater focus

on the cultural structures that bar women from the theatre and insist female characters be played by men. However, in *Peking Opera Blues*, gender play on and off stage becomes as important to the revolution as the heist to secure the documents proving General Tsao's corruption, both by men and women. If Muñoz is correct in assuming that it is an inherently queer impulse to take seriously things that traditionally do not count as serious subject, then the attempts of Tsao Wan and her friends to use gender play not just as entertainment in opera but as a way of changing their political circumstance is likewise queer.

The women queer the theatre every time they attempt to go on stage as women in a theatre that is traditionally performed only by men, for men. But when Tsao Wan wears men's clothes outside of the theatre, she creates a world where drag is possible anywhere. The rigid structure of positioning, an important concept in theatre, especially when staging elaborate fight scenes, expands to include the world outside of the theatre in the film's chase sequence. All five rebels, wearing their disguises as members of the opera troupe, take to the rooftops in a final standoff. Their performance becomes entangled with their attempts at reinventing their political circumstance. For Pat Neil in particular, her dream to perform on stage becomes larger than life as she brings her performance outside of the theatre and makes a new stage for herself in the realm of revolution. While their performances only last as long as the heist, the act of performing affirms that the women were able to engage in the kind of world building that imagined a different version of life. Muñoz states that performance, as a kind of ephemera, ties itself to social relations (10). The women's performance therefore lives on through their relationship to one another, anchoring them to each other even as the heist concludes. Rather than existing within the confines of the rigid stage, their performance takes on a capacious nature and lives within their love.

As Tsao Wan parts ways with her friends, the question of whether or not the revolution succeeds fades into the background. After all, their single heist was only a footnote to an ongoing struggle that, in retrospect, would not come to fruition. What lingers between them is the possibility that, going forwards, their love for one another and the performance they engage in will happen again. The indulgences they shared in General Tsao's home and the performance they put on in attempt to prove his corruption fade due to their ephemerality, but the temporary spaces they constructed through their love remain within their social bonds. For *Peking Opera Blues*, the revolution is nothing more than a fantasy of a world where something may be different. The kinds of worlds created through revolution may just be fantasies, but they will persist as long as those fantasies find their roots in the memories of Tsao Wan and her friends.

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“A new dung-flow cut in lozenges”: Scatological Capitalism in Pound’s Hell Cantos

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Abstract

This paper examines Ezra Pound’s use of scatological imagery in the “Hell Cantos” (Cantos XIV and XV) in light of poststructuralist theories of what Lynch calls “scatological capitalism.” Drawing in particular on the work of Gilles Deleuze and Félix Guattari, Lynch argues that the Hell Cantos present a world in which the abstractions carried out by the capitalist order, those required by the exchange relation above all, are shown for what they are, the “reduc[tion]” of “everything to a state of shit” (in the words of Guattari). Lynch traces the three primary consequences of this “scatologizing” abstraction: the liquidation of a reality made fungible in its every division, the vitiation of subjective knowing, and the abolition of the individual as such. Lynch concludes by showing how scatological modernist poetry might resist capitalist abstraction.

Two citations set the stakes for my discussion of Ezra Pound’s “Hell Cantos” (1930), Cantos XIV and XV, which narrate Pound’s journey through the “hell” of modern London. Unsurprisingly, the first comes from Dante’s *Inferno*. The shade of Bertran de Born, a schismatic, laments: “Because I severed persons thus conjoined, / severed, alas, I carry my own brain / . . . / In me you may observe fit punishment [*lo contrapasso*]” (XXVIII.139–142). This principle of *contrapasso* is individualizing: it commends punishments that resemble or reverse the defining sins of the damned. Punishment according to *contrapasso* always tells you who you, finally, were. The second citation comes from Félix Guattari’s *The Molecular Revolution*: “[C]apitalism reduces everything to a state of shit, of a deterritorialized and decoded flux from which everyone must extract his own share in his own private and guilt-ridden way. The keynote is exchange: absolutely anything, in the ‘proper’ proportions, can be equivalent to absolutely anything else” (253, translation modified). Capitalism is the antithesis of the *contrapasso*: it tells you who you are, but it stacks the deck—it levels everything. As Deleuze and Guattari show, capitalism “create[s] an axiomatic of abstract quantities”—money and its laws of motion—“that keeps moving further and further in the direction of the deterritorialization of the socius” (33). To accommodate decoded (unrestricted) flows of capital and labour, capitalism finds an abstracting or scatologizing order in which all social-territorial

boundaries, especially that between the social and the anus, the “model of privatization” (143), progressively decompose. This process culminates in the destructive universalization, as in a flood, of the excremental form.

I want to argue that Pound thinks through this tension between the autonomy (if painfully and belatedly received) that Dante valorizes and the foetid abstractions of the capitalist axiomatic by refiguring it scatologically. In Pound’s Hell, *usura*, his term for financial capitalism and its vexingly over-broad range of effects, really liquidates the good and true. In the Hell Cantos, mass production and exchange render everything so much trash (“the same shit”), corrupting, in the resultant deterritorialization, materiality, language, and categorial thought, in which, for an ex-Imagist as for anyone who values transcendental subjectivity, solidity is a virtue. For Pound, the final consequence of this deterritorialization is the most devastating: unloosed excremental flows efface public-private boundaries, against the injunction not to “shit where one eats,” and deprive the individual of their autonomy.

Pound’s account of *usura* is necessary to any discussion of the Hell Cantos, given the status of *usura*, in his presentation, as the defining sin of modernity. The “*Usura* Canto,” Canto XLV (1937), offers a provisional definition: “N.B. Usury: A charge for the use of purchasing power, levied without regard to production; often without regard to the possibilities of production.” By the time this definition appears as a postscript to the canto, however, Pound has troubled it. We have learned, for instance, that “[u]sura slayeth the child in the womb / It stayeth the young man’s courting / It hath brought palsey to bed . . .” (XLV.43–45); the relation of this sexual enervation to banking and commercial production is contestable and indirect at best. Granting Pound’s provisional definition of *usura*, we can locate hermeneutic keys to the Hell Cantos in Canto XLV—in particular, a key principle: “[W]ith *usura* is no clear demarcation / and no man can find site for his dwelling” (19–20). Pound’s interest in “clear demarcation[s]” was long-standing. For one, it surfaces in his call for “[d]irect treatment of the ‘thing’” without obscuring ornament in his 1918 article “A Retrospect” (3). This interest also undergirds Pound’s insistence, later in that article, that twentieth-century poetry “will be as much like granite”—hard, with edges—“as it can be” (12). Pound’s desire for clear demarcations is also political and economic: one who wishes to stake out a “site for his dwelling,” as in the lines above, relies on both the separation of the public from the private sphere and the parcelling out of space in the latter. For Pound, the loss of these distinctions is a grave danger: everything becomes the same as solidity and individuality disappear. Not only can one not, given usurious interest rates and capitalist exchange relations, produce high-quality materials (“good stone” [XLV.2]) or attain the funds that autonomy presupposes (“sheep bringeth no gain . . .” [25]), but the

categories of materiality and individuality themselves decompose under such conditions. All-encompassing exchange makes reality semi-solid; *usura* generalizes the form of the “something from nothing,” rendering objects self-exceeding and, hence, unknowable; and the individual, swept up in excremental flows and lacking the stable boundaries that would preserve it, survives as only a residue beneath the social.

A pivotal scene in Canto XV draws these three foci—universal fungibility, corrupt materiality, and foreclosed autonomy—together. Beneath “the beast with a hundred legs, USURA” (XV.20), stand the

laudatores temporis acti [“admirers of bygone days”]
claiming that the sh-t used to be blacker and richer
and the fabians crying for the petrification of putrefaction,
for a new dung-flow cut in lozenges (24–27).

Universal fungibility permits Pound’s use of faeces as a symbol with contrasting referents here. Faced with the “sh-t” of the present order, the “laudatores temporis acti,” as their title implies, fetishize the past, where the Fabians dream of socialism, imagined by Pound as the routinized production of excremental “lozenges”—that is, as the illusory “freshening up” of the present order in a caricatured future, socialist order wherein the fungibility and pitiful differentiation of commodities have been universalized. While emphasizing the homogenizing effects of exchange in the economic realm, this passage also registers the over-broadened significance of faeces as a symbol, enacting the abstraction from the specific nature of faeces that follows the abstraction from commodities and defined economic systems initiated by the capitalist axiomatic. Even the new universal equivalent, faeces, is deracinated under universal exchange, such that it figures everything and nothing. (This over-breadth corresponds to Pound’s presentation of a hundred-legged, hence polysemic *usura*.) By highlighting the worthlessness of that which the Fabians “cut” (27) into interchangeable, equally “shitty” commodities, Pound castigates both the Fabians’ valorization of exchange and the productivist ethos they champion. Inasmuch as faeces is only semi-solid, however, to “cut” it is Sisyphean: it will not hold its shape. This materiality contrasts with that of the idealized “block[s] cut smooth and well fitting” (3) of Canto XLV, and its prevalence in the poem foretells the corruption of categories of materiality: all will become the same, semi-solid substance. This sense that solidity is itself decomposing extends, critically, to Pound’s imagining of the denizens of this scene. Where Pound gestures to individual sinners elsewhere, he only provides group identities here; the eroded distinctions between the objects of group action, as well as the universal equivalent that has initiated this erosion, have soiled groups themselves. Capitalism’s total scatologization proceeds thus: materiality itself collapses

(“goes to shit”) under homogenizing, scatological exchange, leading to the demise of the individual amidst an apocalyptic deterritorialization.

The Hell Cantos as a whole stage this progression at greater length. Most important is its figuration of homogenizing exchange, the characteristic activity of the capitalist axiomatic. Throughout these cantos, Pound offers myriad instances of different modes of production, commercial production in particular, that obtain identically excremental results under the truth-revealing pressures of Dantean Hell and poetry. The earth becomes “a continual bum-belch / distributing its productions” (XV.62–63), the outputs of newly technologized factories, to the denizens of Hell; “Profiteers drin[k] blood sweetened with sh-t” (XIV. 21), where the blood of those killed in the First World War—financed by banks that they might recoup some (usurious) surplus, according to Pound—is “sweetened” by remuneration, here as “sh-t”; a “great scabrous arse-hole . . . sh-t[s] flies” (XV.4), which elsewhere “carr[y] news” (XIV.67) and seem to image the “british weeklies” of XV.50; and Lloyd George and Wilson regard their political outputs with their “[f]aces smeared on their rumps” (XIV.6). While these lines advert to the interchangeability of commodities, money, periodicals, and political speeches due to a general contemporary “badness,” Pound outlines the relationship between exchange and scatology early in the Hell Cantos. His opening salvo in Canto XIV concluded, Pound writes: “[H]ere the placard ΕΙΚΩΝ ΓΗΣ [“image of the earth”], / and here: THE PERSONNEL CHANGES” (XIV.41–42). Hell—really, life aboveground—is a structure of exchange, with historical changes in denizens culminating in a world submerged in faeces. Vitally, this progressive scatologization (of the economic, where exchange originates, and then of all else) is coordinate with abstraction: via this exchange, sinners become faceless “PERSONNEL”—a new facelessness, given the statement of this axiom in English. In brief, the end of exchange is homogenization.

From the scatological exchange of the capitalist axiomatic results, as Pound and Deleuze and Guattari predict, the scatologizing “detrterritorialization of the socius”: that is, the reversal of the process whereby organs were “privatized after the model and memory of the disgraced anus, ejected from the social field” (Deleuze and Guattari 33, 211). The axiomatic ultimately collapses such that excremental flows wash away the boundaries that divide the social into “territories,” rendering autonomy impossible. To explain his terror, Pound attends particularly to the impacts of this (e)sc(h)atology on both terms of the subject-object relation. He shows how objects with new materialities overwhelm the concepts of the subject and how the privately defecating subject disappears after the liquidation of public-private boundaries and manifold infringements on anality, the final seat of individuality.

Pound develops a surprisingly rigorous theory of the object during the Hell Cantos, though it anticipates its obsolescence: since only a transcendental subject, capable of conceptually and really mastering objects, can ground such a theory, the buckling of *usura* under definitional proliferation indicates not theoretical looseness but a lost struggle for this mastery. One of several congeries in the poems stages the decomposition of the object under capitalism quite lucidly: “[F]ætor, sweat, the stench of stale oranges, / dung, last cess-pool of the universe” (XIV.33–34). Notable here is Pound’s attention to scent, which exceeds the “clear demarcations” valorized in Canto XLV because its boundaries are ever-changing and invisible; the containment of a scent is never assured. As is frequently the case, the use of congeries here marks a cognitive failure: these phenomena so overwhelm the speaker that he cannot identify spatial or causal connections therein, nor can he impose linguistic demarcations. Pound significantly reformulates this congeries in Canto XV: “Infinite pus flakes, scabs of a lasting pox. // skin-flakes, repetitions, erosions, / endless rain from the arse-hairs” (57–59). Scents are ephemeral; since they do not have rigid boundaries, they diffuse in minutes. By contrast, this congeries reconciles the ephemerality of its content with the eternality of Hell’s punishments: “pus flakes” disappear quickly, but they comprise an “[i]nfinite,” erosive stream here; “scabs of a lasting pox” and “endless rain from the arse-hairs” signify similarly. Pound concludes this series of congeries by observing that dwelling atop “nothing that might not move, / mobile earth” results in “[o]ne’s feet sunk, / . . . / the bog-suck like a whirl-pool” (XV.46–47, 65–67): modern flux, generated by the interchangeability of everything and the consequent signification of nothing, entraps one in a ceaseless flow. At times, this entrapment even seems intellectual and not only bodily: such paradoxes as “liquid animals, melted ossifications” (XIV.84) soil categories in their enunciation, muddling the mind as their referents corrupt the flesh.

This weakening of the intellect demands a turn from the object- to the subject-pole of Pound’s scatological epistemology. This latter pole is not quite evident in his poems; after all, amidst the deluge of excremental flows, whither the subject? To dramatize its disappearance, Pound satirizes modes of politics and religion prominent in the 1920s that he feels infringe upon the private sphere and so deprive the subject of any “site for his dwelling” (XLV.20). Canto XIII, in which Pound sketches his politics, articulates the distinction underlying this satire. In this canto, Pound valorizes the principle of “brotherly deference” (XIII.53), which he locates in texts by Confucius, over and against the Christian “love thy neighbour.” As Roxana Preda points out, the latter “is noble, but gives no safeguards against intrusion into private affairs and fanaticism,” whereas the former does so (*OCCEP* XIII n18). The

absence of “brotherly deference” in the Hell Cantos, then, indexes the effacement of the subject amidst a general scatologization.

Two instances stand out. The first, political example is the Lloyd George–Wilson set piece that begins Canto XIV, in which the pair stand “Bush hanging for beard, / Addressing crowds through their arse-holes, / Addressing the multitudes in the ooze” (XIV.8–10). The private becomes public in a double sense here: Lloyd George and Wilson expose their genitals to the “multitudes” as they embroil those “multitudes” in their (and all others’) excremental, indifferently personal-political output—their “ooze.” The “multitudes” even seem to decompose into this ooze, given the unity suggested by the long-“u” assonance. This image ultimately suggests that being taken in by mass-politicking relegates one to a pile of undifferentiated faeces. We later encounter the more painful, religious example of the bishop with “tattoo marks round the anus” (XV.13). These marks, suggesting a prohibition against sodomy, literally circumscribe the anality—the respite of individuality—of this individual. In inscribing believers’ bodies, this suggests, the Church wrests from them all privacy. In both examples, the scatological (or private) becomes the public and vice versa, finally indistinguishable from the specifically economic scatological imagery I discussed above.

Fortunately, the scatologization that Pound narrates can be reversed. In the concluding lines of Canto XV, Pound appends a salvific finale to the (e)sc(h)atology I have been describing, locating the coming of a new world in heroically formed poetry about the old. As Pound struggles to escape Hell, he encounters the shade of Plotinus, who counsels him to

Keep your eyes on the mirror.

Prayed we to the Medusa,

petrifying the soil by the shield,

Holding it downward

he hardened the track (74–78).

If “clear demarcations” overcome the semi-solidity of Pound’s Hell, and Pound achieves these clear demarcations here (“he harden[s] the track,” called into appearing as a track), we must attend to the peculiarities of this act of hardening. The speaker “[h]ammer[s] the souse into hardness, / the narrow rast, / Half the width of a sword’s edge” (87–89); that is, the speaker crafts. The reattainment of autonomy, then, consists in a poietic act—and, more specifically, surely a poetic act of “hardening,” as his use of a representing “mirror” (as well as the presentation of modern poetry as granite in “A Retrospect”) suggests. Just as the speaker, like the Perseus of myth, wins the day by redirecting the evil power of Medusa for good via his shield, Pound renders a fallen world phenomenally stable by and in his challenging re-presentation thereof. This approach makes sense as a response to the

capitalist axiomatic: since this axiomatic is abstracting, Pound—who, famously, would have us “[g]o in fear of abstractions” (“A Retrospect” 5)—“hardens” the world via solid art and so materializes, recodes, and thereby undoes this scatological axiomatic, countering its collapse. Canto XV’s final lines mark the return of cultural stability in the re-emergence of the Western tradition: “Whether in Naishapur or Babylon,” a quotation from the *Rubáiyát* (XV.96); “Ἐέλιον τ’ Ἡέλιον / blind with the sunlight,” the individual vision of the Plotinian Good (XV.103–104).

In sum, Pound, in his *Hell Cantos*, exposes and critiques the scatological and scatologizing capitalist axiomatic, its suboptimal (“shitty”) economics, and its final “reduc[tion of] everything to a state of shit” (Guattari 253). Like Guattari, Pound begins with exchange, showing how flows of varied but at bottom identical commodities create a state of universal, foetid fungibility, leading to the abolition of the subject: uncontainable objects vitiate acts of knowing; the subject becomes part of a mass “ooze.” Ultimately, Pound discovers salvation from the hell of *usura* in his (e)sc(h)atological poems, the creation of that which makes one exclaim, “This shit is hard!”—the phenomenal hardness of re-presented flows, petrified as and into incorrupt materiality by artistic *poiesis*, and, indeed, the intellectual “hardness” of modernist poetry.

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Decorums of Influence: An Analysis of Milton's "Sonnet 19"

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When Stanley Fish considers how Milton wrote his lines, he carefully notes one decorum that the poet does not bother to hide: the Aristotelian rigour of classicism, which concerns "style, sentence length, and vocabulary" (Fish 119). In his *Poetics*, Aristotle argues that proportionality, appropriateness, and unity beautify art. By close adherence to a decorous style, governing everything from metre, sentence length, and plot, poets capture a universal logic that sufficiently describes all that is beautiful. Writing participates in a form of craftsmanship; just as a tailor fashions clothes that fit and serve their function, so too does a poet fashion language to do the same. All considerations extend from practicability.

Petrarch, who Milton copies, follows centuries later what Aristotle proposes but with his own innovations. Not conforming to the tragic or comic mode, or to any pre-extant genre of writing, Petrarch gives "scattered rhymes," deliberately fragmentary because the author misses his poetic excellence, his Laura. Nonetheless each piece of the poem is internally consistent — every sonnet follows the Petrarchan rhyming scheme, cunningly wrought in pursuit of laurels that are always out of reach. Though unorthodox, Aristotle would approve Petrarch's *Canzoniere*, merely because the form was devised to suit the purpose of the poem; Petrarch's mastery over language pervades the text. Because he kept the classical edicts, Petrarch became prominent during the English Renaissance, where classicism received renewed attention. From Petrarch arose the Renaissance strain of dedicatory poetry, producing such sonneteers as Sidney, Wyatt, and Surrey. All adapt Petrarch's Italian into English with varying degrees of success; owing to the Petrarchan sonnet's unique rhyming scheme, translation was difficult. The Italian language better accommodates numerous and varied rhymes while English stretches to keep up. For this reason Wyatt makes some alterations in his direct translation of Petrarch, eschewing the sestet in favour of maintaining a more even rhyme scheme throughout, plus couplet. Surrey gives up on the English Petrarch altogether and founds his own poetic school. Milton, meanwhile, observes all of these developments and — outrageously — ignores them.

To say Milton's sonnets are stylistically awkward would barely fall short of stating the obvious; Milton knows what he writes. He pushes English into a medium that does not welcome it in the slightest. Returning to the tailor metaphor, the effect is similar to squeezing an adult into children's clothes. Milton's "Sonnet 19," in particular, stubbornly suffocates in an old Petrarchan

suit, as if it is going through a midlife crisis. Certainly, its author was: Milton presciently understands that he has already spent “half [his] days” (2), and worries about how he will spend the remainder. He dwells on the past, desperate to resemble a legendary craftsman that everyone struggles to imitate, even at the expense of the fluidity and evenness of his poem — often, Milton ends lines mid-thought, only to abruptly resume the next line. Take lines 4-6: “...though my Soul more bent / To serve therewith my Maker, and present / My true account...” (4-6). These lines are by no means unusual. I could have chosen multiple other points in the sonnet, including the volta — which occurs in the middle of line 8, before the sestet — easily. Modern reproductions do not even bother with consistently punctuating the termination of most lines, as is the case with Surrey, Wyatt, and Shakespeare. Everything about Milton’s style is choppy and unkempt. Regardless, “Sonnet 19” is technically a perfectly iambic Petrarchan sonnet, which is more than can be said for the sonnets of Milton’s contemporaries.

If Milton pays a stylistic toll importing Petrarch into English, it is for the traffic of poetic beauty, which classical decorum has and which Milton has to do without, or at least with little. Milton’s stilted verse, because of its poor fittingness, sacrifices clarity in satisfying the decorous conditions of the Petrarchan sonnet. So when Milton famously deliberates “how [his] light is spent” (1) in the first line of “Sonnet 19,” he refers to, besides his loss of sight, the loss of clarity in joining a venerable classicism. Whatever Milton means by “light,” be it vision or poetic fidelity, it has less to do with innate virtue and more with a God-given talent of perceiving and reporting truly. Great writing has truth value, and God seemingly expects Milton to deliver. “Sonnet 19” retells the Parable of Talents, which teaches that servants ought to increase what their masters entrust them and not simply maintain it. Line 3 makes explicit reference to the proverb: the servant who is found lacking is he who is given “that one Talent which is death to hide” (3). Milton’s talent is not a measure of gold, though he estimates his worth near as much. Like money, Milton’s talent must be invested, doubled and multiplied; it is finite and needs improvement to protect the interests of the Master that bequeathed it. In this solemn duty Milton fails. He receives by divine providence the entirety of the classical tradition, with all of its truth-excavating power, but unlike Wyatt or Surrey fails to improve on it. Milton’s “light” has been “lodged with [him] useless” (4).

The sestet responds to these considerations of worthlessness, answering back with a case against decorum. Milton implicitly understands that the classics are beautiful because they are true. They are true not because they are factual, but because they are everything Aristotle says they are: suitable, orderly, and above all, accurate to the human experience. As Sidney

puts it, artists offer a golden world, they represent what should be instead of what is. But every golden world seem brazen wherever God is involved — he has no need for a better world, being himself the ideal. “God doth not need / either man’s work or his own gifts,” (9-10) goes Milton’s reply, speaking through Patience personified. Every poet, from Homer to Dickinson, strives for perfection in verse. In every poet there is a quest for the Petrarchan Laura, and, like Petrarch, they are impatiently journeying to arrive there. Something about Milton’s subversion of the Petrarchan trope is admirable; after all, the OED defines patience as the “tolerance of faults” (OED). Milton learns from Patience; he calls Petrarch’s pursuit of excellence futile. Even using far more talent than what Milton finds within himself, no poet can outdo God.

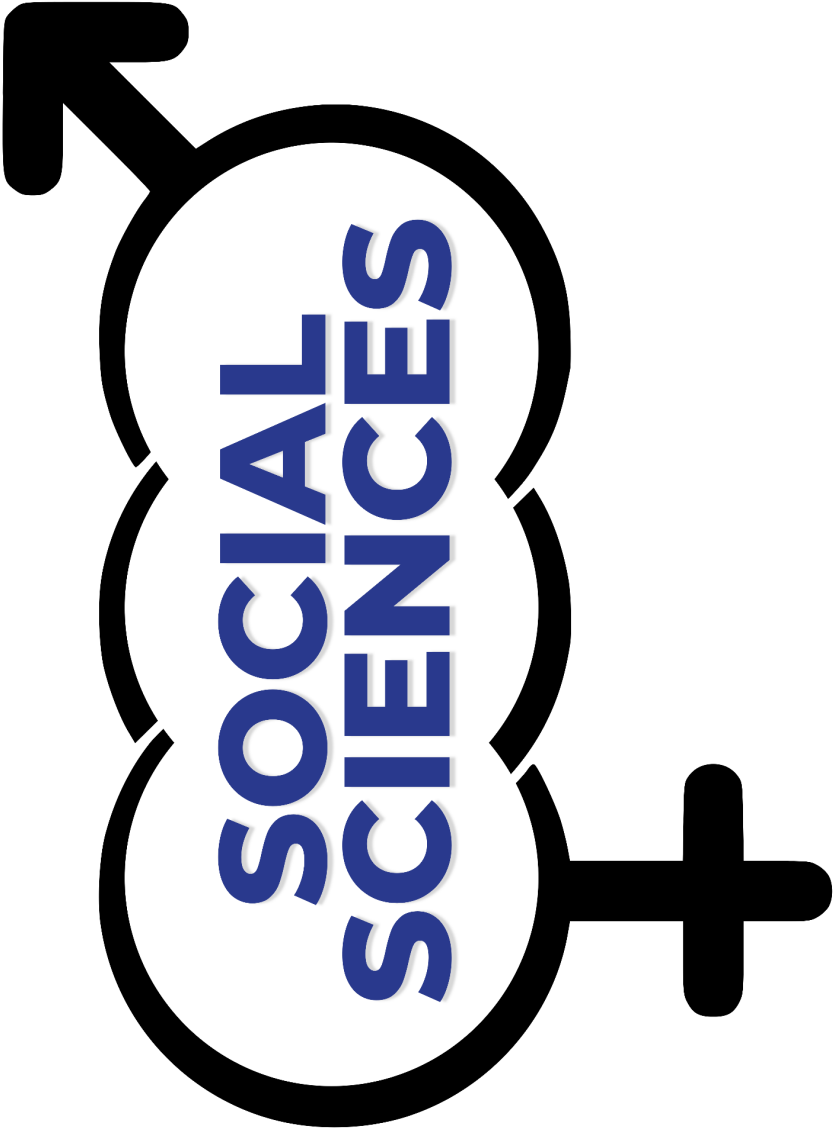
Milton’s verdict shows “an inner decorum that is achieved only by being allied steadfastly to the source of being” (Fish 119). The concluding sestet notably blurs distinctions between the author and his creator. The phrase “his state / is Kingly” (11-12) leaves one unable to ascertain who wields the authority in the conclusion of the poem: is it God or Milton? The famous final line, “they also serve who only stand and wait” (14), is a moment of control in an uncontrolled and faulty work. Breaking the pattern dominating most of the poem up to that point, Milton does not continue where the previous line left off; this is one unbroken idea in a stream of half-completed, pausing stutters. In a stable stop for an unmitigated landslide of a sonnet, Milton shows himself capable of the linguistic command his rivals strive for. He chooses not to use his gift, like the unfaithful servant he buries it deep within the text. But Milton avoids perdition by appealing to the ultimate authority that is God. Decorum, order in diction, organization, and metre, is not necessary in the “light” of God’s perfection. Even without laboriously re-capturing the decorum of the classics in a new language, even if Milton will “only stand and wait” on tradition, he will “also serve.”

Yet Milton must not be thought of as intellectually slothful or conservative, rather, his is a new decorum that cannot be evaluated by Aristotelian criticism. Excellence in poesy cannot be achieved by matching the high formic consistency of logic embodied in classicism, but rather by emulating those “who best / bear [God’s] mild yoke” (10-11). Usually the yoke implies hard labour, the driving of cattle and beasts of burden, but not this yoke: God’s yoke is mild. There is work, yes, but it is easy work that can be mitigated depending on one’s ability to carry the burden optimally, to shift weight away from oneself and onto others. When Milton writes an imperfect sonnet, he relies on stronger writers to inform it; indeed, Milton saw himself heir to several astounding poets that already contributed their “light” before him. Milton asserts that God saddles all poets in an exodus towards perfection — one need only dutifully make way and God will see you to the end. Milton

abandons unnecessary weight in this undertaking, including the decorums of style; keeping “a loyalty that is entirely interior and therefore not available to empirical verification” (Fish 119) as transcendently sufficient.

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Tongzhi Politics: The Potential of Chinese Constructs of Same-Sex Eroticism in Achieving a Transnational Queer Discourse

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There has often been a tendency to make Western queer theories conclusive of all queer lives in the world. However, queer studies scholar Martin Manalansan contends that it is crucial to develop a transnational framework (2015, 566). Indeed, sexual practices and interpretations are highly situational and are constructed at the conjuncture of social, cultural, and historical contexts. In this essay, I first introduce the *tongzhi* politics of China and Hong Kong and explain how it differs from Western *queer* politics and is thus more representative of the ‘queer’ scene in China. In the next section, I closely translate the modern and Chinese languages to make the case that the traditional Chinese relational construct of sex is fundamentally different from the Western LGBTQ discourse that is often based on identitarian politics. Chinese same-sex eroticism must be read in the context of a patriarchal-classist hierarchy throughout the Chinese dynasties. In the final section, I explain the problems of transplanting Western queer strategies to Chinese contexts. To follow, I introduce the cultural-specific approach of *tongzhi* politics and its potential to become a valuable contribution to the transnational queer discourse. This essay aims to reflect on the social, cultural, and historical specificities that conditioned the *tongzhi* discourse in mainland China and Hong Kong. Whereas the Western queer discourse is built on a foundation of individualism, *tongzhi* discourse is born from the relational perception of same-sex erotic relationships in the Chinese way of knowing, therefore bearing with it a distinctive approach to queering the heteronormative.

***Tongzhi* Politics as Resistance to the Homogenization of Western Queer Theories**

Western queer theories have often had a totalizing effect that makes itself the dominant model of discourse in non-Western spaces. Manalansan wrote that “‘metronormativity’ or the urban-centric studies and frameworks of queer lives are often based on such monolithic constructions and binaries” (2015, 566). In 1992, a *tongzhi* group in Hong Kong organized a queer pride parade, but since only ten expatriates and two overseas Chinese decided to participate, it ended up being cancelled. Local white activists criticized that

this incident demonstrated Hong Kong *tongzhi*'s lack of courage and liberation (Chou 2000, 252). However, they failed to consider the applicability of Western confrontational politics in the Hong Kong and Chinese cultural context wherein the family-kinship system takes precedence in forming a person's identity. Conversely, Western LGBTQ movements like 'pride' derive much of their power from stressing individual authority.

Furthermore, the image of Western queer activism has been received by many Chinese themselves as the ideal model for queer liberation without understanding the social, cultural, political, and historical context that contributes to a set of problems specific to the Chinese and Hongkongese scene of sexual liberation. An expression commonly used by young Chinese males nowadays is a mix-coded language such as '*wo hen gay, ta hen gay, zanmen douhen gay*' meaning 'I'm very gay, s/he is very gay, we are all very gay.' Since in traditional Chinese, there is no linguistic or cultural equivalent for terms such as 'lesbian,' 'gay,' 'bisexual,' 'homosexual,' or 'transgender,' and so on, they resort to switching between two different linguistic traditions, thereby adopting the Western notion of sexuality.

However, notions of sexuality are culture-bound, and practices of sex are never completely natural but are constructed in cultural and historical contexts. Travis Kong warns against the passive acceptance of Western queer theories as a dominant framework for non-Western spaces such as China and Hong Kong, as it is oblivious to the socio-structural configurations that construct the local queer "'lived experiences,' habitus, and practices" (2020, 476). While modern Western gender discourses have generated useful analytical frameworks for the US/West, they cannot be uncritically applied to non-Western spaces such as China and Hong Kong, where the representation of same-sex erotic relationships is heavily bound up with the family kinship system.

Thus, to engage in a discourse that responds to the cultural specificity of China and Hong Kong, for this essay, instead of 'queer' or 'LGBTQ', I will be using the term *tongzhi*, the most popular contemporary Chinese term for queer and homosexual. *Tong* is the Chinese character for 'homo' or 'same', and *zhi* means 'goal, will, orientation, spirit'. The word was first popularized by the Communist and Nationalist Parties to refer to their respective comrades. In 1989, the term was appropriated by a gay activist in Hong Kong for the first Lesbian and Gay Film Festival. Thus, the term *tongzhi* is a fluid term that extends far beyond just the sexual. It symbolizes an integration of the queer sexual and the shared political goal to challenge heteronormativity, transcending the homo-hetero dichotomy without losing the specificity of the sexual minority (Chou 2000, 5). Moreover, the notion of 'sex' is absent in the

word *tongzhi*, for *tongzhi* is not defined by the sex of a person's erotic partner but rather connotes a range of minoritized sexual practices. Unlike 'lesbian,' 'gay,' 'transgender,' and so forth, there is no conclusive definition of *tongzhi* because the term suggests a sexual and political fluidity that embodies the Chinese notion that 'identity' is a constant process of becoming (Chou 2000, 20).

While in the Western queer discourse, activists have confronted the heteronormativity through reappropriation and reinterpretation of derogatory words such as 'queer' (Bailey 2013, 68-69), *tongzhi* politics harmonize social relationships by appropriating a word most sacred to mainstream Chinese culture and contemporary history. Cathy Cohen, a political scientist and activist known for her work on intersectional feminism, observed that the problematic homo-hetero antagonization in Western queer activism (2005, 25) is, therefore, less pronounced in Chinese and Hong Kong *tongzhi* politics. This finding stems from the fact that the approach of *tongzhi* empowerment is not the confrontation and antagonization of the mainstream, to begin with, but rather the queering of it.

Positioning Same-Sex Eroticism in the Chinese Patriarchal-Classist Hierarchy

Cohen criticizes Western queer activists who evoke a single-oppression framework while failing to recognize the greater intersecting power structures that dictate the lived experiences of queer subjects (2005, 25). Oftentimes, the LGBTQ discourse is thrust upon the Chinese queer scene without asking a critical question: what intersecting powers and social forces shape the queer discourse here?

For this essay, the term 'same-sex eroticism' is used instead of LGBTQ. In the Western queer discourse, sex, gender, and sexuality are meant to indicate three different categories that go into the constitution of a person (Bailey 2013, 31). In 'LGBTQ,' 'LGB' refers to three sexual orientations, 'T' refers to non-heteronormative gender identification, and 'Q' encompasses all the non-heteronormative, implying a homo-hetero duality. However, the Western constructs of gender, homosexuality, perversity, and biological determinism were only introduced to China in the nineteenth and twentieth centuries during *Yangwu Yundong* (Chou 2000, 14), literally translated as the Westernization Movement, in which Western technology, religion, and ideology—including sexology—were gradually and selectively imported to China in the name of modernization. It is important to note however that the primary attitude that drove Westernization was not admiration of Western

culture, but rather an anti-imperialistic nationalism for building a stronger China.

To begin with, as opposed to the way ‘LGBTQ’ describes a person’s property of gender or sexuality detached from the wider social relations, the Chinese way of knowing sees a person’s self and identity not as fixed on a psychological or sexual essence, but as formed, altered, and dismantled through their relation to others (Chou 2020, 20). Before the adoption of Western gender categories of ‘woman’—a term that describes a person’s identity as an independent person—in old Chinese texts, *funü* is the predominantly used term that refers to a woman as embedded in a family-kinship system. Moreover, whereas in the Anglo-Saxon language, *femininity and masculinity* are two fixed, antagonistic, and mutually exclusive binaries distinctive of the two sexes, in Taoist cosmology, *yin-yang* is a complementary, interrelated, and interdependent binary order that both the male and female correspond to and where an individual’s property of *yin-yang* can only be defined in a relational context. Thus, although men are generally portrayed as *yang* and women are more generally portrayed as *yin*, *yin* and *yang* are not intrinsically sexed. For example, between a man and his wife, the man is *yang* compared to his wife who would be *yin*. But in a mother-son relationship, the mother would be *yang* compared to her son who would then be *yin* (Chou 2020, 18).

Furthermore, while the Chinese philosophy of *yin-yang* was substituted with the Western notion of sex, gender, and homosexuality in the nineteenth century (Chou 2020, 14), even today, there is still no true equivalent of the concept of ‘gender’ in the Chinese language. The modern Chinese word meant to be the equivalent of ‘gender’ is *xing bie*, which ironically, literally means *sex differences*, implying the biological differences between the male and female. For the gender category of ‘woman’ in English, its Chinese equivalence, *nüren* appeared only recently in the nineteenth century and literally means *female person*. The modern Chinese term meant to translate ‘transgender’ is *bianxing zhe*, which literally means *sex-changed person*. The present notion of *transgender* in Western queer theory refers to people who, regardless of whether they underwent sex reassignment surgery or not, identify as a gender identity different from what was assigned at birth according to their sex. However, this notion is lost in its supposed Chinese translation, because in the indigenous Chinese way of knowing, there is no concept of ‘gender.’

Thus, in traditional Chinese, there is not a distinctive conceptualization of homosexuality because sex acts are contextual and relational. The sociocultural concern of sex lies not in the sex of a person’s erotic partner, but

rather in the social relationship and hierarchy in which sex happens (Chou 2020, 19). Obscenities to insult a person in the Chinese language such as *shou*, referring to the one being dominated in a sexual act, signify that in traditional Chinese, social hierarchy and distinction of power are more crucial than the sexes of the people involved in a sex act. For an emperor, a nobleman, or a wealthy lord, sexual activities with a man do not diminish but further confirm his social power (Chou 2020, 27). Major historical Chinese scholars such as Ban Gu and Sima Qian use the characters *chong* or *pi* for rulers' female and male favourites, without any distinction of "homosexual" or "heterosexual." *Chong* and *pi* are more social terms than they are sexual terms, for they primarily imply a hierarchical relationship between the master and his servant.

Finally, while there exists an abundance of words for male same-sex relationships such as *duanxiu* (*cut sleeve*), *xiang gong* (*male prostitute*), *fen tao* (*shared peach*), *nanse* (*male beauty, eroticism and seductiveness*), and so forth, words for female same-sex relationships are significantly scarcer. Documentation of sexual relationships between females was systematically omitted (Chou 2020, 30) not because of the rejection of same-sex eroticism itself, but because female same-sex acts threaten male superiority over females. This suggests that what characterizes same-sex acts in the traditional Chinese historical context is in fact the patriarchal-classist hierarchy that permeates both homosexual and mainstream culture. This cultural-historical specificity which interprets the sexual through the social continues to the modern day and ideologically informs the direction and strategies of the *tongzhi* movement.

***Tongzhi* Strategies of Queer Empowerment**

The Western LGBTQ empowerment project of coming out (*zhan chu lai*) strikes a different response in Chinese communities due to the different cultural connotations it has in the local context. In the West, 'coming out' reaffirms American individualism and the atomization of the self. Coming out to one's friends and family is considered a powerful act of self-expression that marks the establishment of the genuine self. This is not to trivialize the pain and challenges of coming out that Americans face, nor to minimize the diversity of queer strategies in the West, but the point to be made is that while Western queer discourse focuses on subverting the institutional minoritization of queer people, the present stage of the Chinese 'queer' discourse finds its biggest adversary in the home (Chou 2020, 254).

As discussed in the previous section, Chinese personal identity is defined through their relationship with others. Given the precedence of family

status, *jia chou bu ke wai yang* (domestic ugly affairs should not be spread publicly) is a principle that grounds the Chinese families' way of doing things. Thus, the difficulty for parents is not only accepting their child's queerness, but also the burden of facing their friends, relatives, neighbours, and ancestors. These fundamental values have remained in place for even the more Westernized cities such as Hong Kong and Taipei (Chou 2020, 254). As one Hong Kong *nan tongzhi* (male *tongzhi*) activist remarked the following: " 'I don't think sex is necessarily more important than my family or other parts of me, so why should I segregate them and amplify my sexuality' " (Chou 2020, 264)? Thus, for the Chinese and Hongkongese, queer activism is not something that can occur detached from the family-kinship context.

Tongzhi is an alternative empowerment project that challenges the traditional Chinese culture—not by denying it or overriding it—but by peacefully negotiating the family interest and the individual space. A common approach is by breaking the insider-outsider distinction, which Chou calls *hui-jia* (coming home) (Chou 2020, 259). Home refers not just to one's biological family that a *tongzhi* might likely struggle with their whole life, but also to the chosen family—the *tongzhi* (comrade) of a queer person that provides them with support. This resembles the way that Ballroom culture in the American transgender communities provides its members with the sense of belonging and comfort that they cannot receive from their original family (Bailey 2013, 48). The Chinese family-kinship system creates a strong notion of *them-us*, yet at the same time, the boundaries of Chinese familial groups are highly malleable. Ching, a *tongzhi* woman interviewed by Chou describes the way her mother gradually accepted Ching's lover as an adopted same-sex friend and integrated her as a new family member: " 'I think at first my mother treated Yee as my younger sister, then later as her second daughter, and now Yee and me are treated as a couple, like wife and husband' " (Chou 2000, 265). Therefore, *tongzhi* politics sets its priority not as subverting the heteronormative, but as a case-by-case personal practice of negotiating the family and the self.

Furthermore, *tongzhi* politics can be a valuable contribution to queer discourse in both the Chinese and Western worlds. Historically, in China, there was no line between the 'hetero' and the 'homo.' If we were to take this contextualized sexual fluidity seriously, then *tongzhi* becomes not just a movement for the *tongzhi* minority, but for everyone. In what is known as China's first *tongzhi* movie, *East Palace, West Palace*, a 'straight' policeman detains a young male homosexual (*tongxinglian*), A-Lan, for an overnight interrogation. However, the interrogation is soon reversed, with A-Lan enticing the policeman to examine his own innermost sexuality. The

policeman eventually falls for A-Lan's seduction and kisses him passionately. Throughout the movie, the policeman's sexuality was never explicitly defined. Indeed, if same-sex eroticism is something anyone can potentially come to enjoy, there is no need for a homo-hetero duality. Therefore, this movie presents the valuable *tongzhi* strategy where *tongzhi* reclaim their own voice by inviting everyone in the heteronormative world to explore their own sexuality.

Nevertheless, given the patriarchal-classist hierarchy that is deeply embedded in Chinese culture and society, the *tongzhi* movement has limitations of its own. Founded in 1996, Queer Sisters is one of the most well-known groups in Hong Kong that advocates for the visibility of non-heterosexual-identified women while resisting the labels of 'lesbian,' 'gay,' or 'homosexual' to move beyond the homo-hetero duality. Additionally, given the vastly different modern political histories between mainland China Maoist socialism and the British colonial rule of Hong Kong, the mainland Chinese discourse of *tongzhi* must not be carelessly associated and merged with that of Hong Kong (Chou 2000, 287). It is crucial to achieve a trans-local knowledge of queer discourse for the same reason that we must achieve a transnational queer discourse. Despite its limitations, however, *tongzhi* discourse—carrying the cultural specificity of Chinese socio-cultural and historical context—has great potential in contributing to the transnational queer discourse.

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Deconstructing the Oppositional Relationship Between the Digitalization of Fourth-Wave Feminism and Inceldom

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The current fourth wave of mainstream Western feminism can be viewed as the synthesis of multiple feminisms and social issues, underpinned by theoretical intersectionality through the prominence of social media. Inceldom, whilst also having an altered culture through digitalization, continues to have its values and relationship to feminism rooted in its historical development. This paper argues that the intersectional digitalization of mainstream fourth-wave Western feminism occurs through the democratization of the grievances of a broader range of women, but is subsequently limited by the online incel countermovement. This paper will commence by explaining the changing nature of mainstream Western feminism and inceldom and explore the impacts of digitalization on both. It will then analyze the ideological and operational differences and interactions of both movements, framed through the analytic lens of the new social movement theory. This paper aims to demonstrate how in spite of movement evolutions, modernization does not guarantee that present movements are inherently separate from their historical counterparts.

The “waves” method of categorizing mainstream Western feminism throughout history demonstrates the evolution of women’s rights movements in the West. According to Looft, in its first wave, the mainstream Western women’s movement generally focused on abolishing slavery and providing women access to equal citizenship rights (2017, 894). In its second wave, this movement focused on enabling women to have greater access to male-dominant spaces (Looft 2017, 894). The third wave brought with it significant technological and ideological shifts, as women within the movement began challenging the concept of universal ideals and took to social media to express their beliefs and experiences (Looft 2017, 894). The fourth wave, extending this concern about the universalization of interests, led to a shift wherein intersectionality and a reliance on technology encompassed the Western feminist movement’s approaches and methods (Looft 2017, 894). Between the third and fourth waves, there was a significant increase in the participation of marginalized communities, arguably through the digitalization of feminism.

Digitalization has enabled an intersectional surge within mainstream Western feminism. Middle and upper-class White women have historically been the gatekeepers of mainstream Western feminism, defining it through the seemingly shared experiences of all women, largely void of gendered and

classed analyses (Evans and Bussey-Chamberlain 2021, 361). According to the process of collective identities within the new social movement theory, collective action emerging from this synthesized identity is made up of smaller groups (Staggenborg and Ramos 2016, 28). This mainstream Western feminism approach was not conducive to unifying the smaller groups of women beyond the general foundation of gender. Throughout the third wave, as women began challenging the idea of a monolithic “sisterhood” (Evans and Bussey-Chamberlain 2021, 360), intersectionality gained popularity.

With the rise in popularity of intersectionality, there arises the question of how a framework stemming from Black feminist thought, a historically marginalized and peripheral intellectual and activist space, gained mainstream success online, considering the pervasive role of Whiteness in forming the mainstream Western feminist frameworks. As Williams writes, “Black feminists' use of social media fills the gap in national media coverage of black women's issues ... Twitter is often a site of resistance where black feminists challenge violence committed against women of color ” (2015, 344). Despite the historical Whiteness engulfing mainstream advocacy surrounding women’s issues, digitalization has provided different groups of women, like Black women, platforms from which they are able to voice grievances specific to the unique struggles they face due to the intersections of their identities. This theoretical framework acted as a tool for women to view their complex identities with nuance as they positioned themselves within the varied and overlapped sociopolitical hierarchies in their societies. They are able to not only navigate their personal experiences of inequity through intersectionality but can also understand why such inequities exist and relate them to power structures by understanding how various hierarchies are interconnected to reproduce power differentials. The use of intersectionality in the more informal setting of digital activism enables marginalized feminists to ground their claims of differential inequalities in theory, rather than solely on anecdotal evidence.

The world of digital activism has developed a new culture around social movements. The combination of anecdotal evidence grounded in theory, and its accessible representation through social media, has altered the course of feminism. This can be understood through the migration of intersectionality from the more exclusive realm of academic institutionalization to informal digitalization. The platform and language with which intersectionality is discussed shifted with this migration, creating an unprecedented level of accessibility which enables marginalized women to ground their experiences in this theory. Digitalization has intercepted the culture of academic exclusivity and elitism that theory has previously existed within and democratized academic knowledge-making language and theory. Through digitalization, power within social movements no longer solely

centres upon racial and class hierarchies. Power as well exists in relation to the new meaning placed on marginalized experiences grounded by democratized academic knowledge-making techniques.

The incel countermovement developed as a response to mainstream Western feminism, evolving as a way for members to express their discontent at the challenges the women's movement posed to traditional ideas of White masculinity and structural patriarchy. As Marwick and Caplan write of the emergence of the men's rights movement in the early 1970s, which coincided with the second wave of mainstream Western feminism, "men's rights scholars ... acknowledged that sexism harmed women, but emphasized that strict gender roles and patriarchal society were equally harmful to men." (2018, 545). This centring of men in relation to women's movements led to the eventual shifts within the beliefs of men's rights sub-movements, rendering anti-feminist rhetoric characteristic of men's rights social movement spaces. Marwick and Caplan conclude that the rise of the men's rights movement is a direct reaction to the perceived deteriorating status of White and cis-gender men with the rise in popularity of mainstream Western feminism, especially throughout the second wave (2018, 546). Men's rights movements, including inceldom, have developed as a socially organized response, and eventually an ideological opposition, to women's rights movements.

In being a reactionary movement against mainstream Western feminism, the goals of the incel countermovement exist in objection to the general mainstream feminist ideas of gender equality. According to the new social movement theory, "collective identities are continually constructed by small groups in the 'submerged networks' of everyday life." (Staggenborg and Ramos 2016, 28). The collective identities which constitute the mainstream Western feminist movement are also constructed by smaller groups, each with their own beliefs and values, as characterized by the decentralized and participatory nature of new social movements. Lara writes, "Western women's movements ... stress[ed] the need to locate their disagreement about how women were treated and translat[e] it in terms of rights." (2004, 67). Within the feminist movement, there is no general consensus surrounding a specific set of goals, especially in relation to policy. However, there is a general sense of agreement surrounding the shift towards equitable societal gender norms that can then be translated to rights. The online incel movement has a general agreement about reconstituting traditional gender relations through structural patriarchy, based on the idea that this is "the natural order" (Cottee 2021, 96). The goals of feminism and inceldom can be understood through their broader goals concerning gender equality, specifically concerning societal norms which govern the daily functionalities of gender. This paper, therefore, emphasizes societal norms rather than policy.

Digitalization emphasizes the ideological and operational clashes between inceldom and feminism. According to Marwick and Caplan, “the internet has been key to the popularization of men’s rights activism and discourse” (2018, 546). Nostalgia fuels the online incel culture, as the roots of the original men’s rights movement stem from a yearning for traditional masculinity (Marwick and Caplan 2018, 546). Many incels currently long for a return to a “pre-1960s world” of women’s subordination to men (Cottee 2021, 96). Digital feminists of marginalized backgrounds, however, emphasize contemporary issues, viewing them as a product of the historic oppression that the current gender and racial dynamics and power structures in their society rely on. Further, incels use anecdotes to justify their frustration with current gender dynamics. This differs from the modern digital feminist use of anecdotes, which, as explained earlier, are grounded in academic theory to form their intellectual and political worldviews. Through the use of intersectional theory, feminists are able to contextualize their individual experiences within broader oppressive structures. Incels, without the widespread use of underlying critical theoretical frameworks, use individual experiences to form broad generalizations about society, centering their feelings of frustration. In this way, incels use their online spaces to vent (Cottee 2021, 109), whereas digital feminists, through both venting and the use of intersectionality, can critique the structures that inform their experiences. As such, digitalization has led to varied uses of online spaces for fourth-wave feminists and incels, reflecting their evolutions as they maintain their general aims regarding gender.

These varied uses form the basis from which incels view contemporary mainstream Western feminism as a threat. As the foundation of inceldom lies in its responsive nature to women's movements, there has been a cultural shift within modern-day inceldom through digitalization as a means of responding to the new feminist power configurations. This has occurred largely through spatialities and community borders. The existence of online incels requires a level of exclusion, as the ideology itself relies on the exclusion of women. On the contrary, digital feminist spaces use mainstream online platforms to communicate grievances, which have opened up to a broader array of participants through the popularization of intersectionality. With a growing online community of empowered women, incels become concerned about the supposed deterioration of the patriarchy and racial hierarchies. As incels still require mainstream cultural validation (Cottee 2021, 98), they can enter and invade digital feminist spaces as a means of validating themselves amongst other online movements and as a reaction to the expanding borders of feminism. According to Marwick and Caplan, this spatial invasion disproportionately impacts women of colour and queer women, who have come to view online incel harassment as a norm (2018, 545). Further, the

presence of incels is used to police women's participation in the online sphere (Marwick and Caplan 2018, 545). Although digital feminist spaces emphasize inclusivity, incel presence acts as an invasion of digital feminist spaces for solidarity-building and meaningful dialogue due to their oppositional ideology. In harassing and subsequently policing the online participation of women by invading their online spaces, online incelism is limiting the functionality of digital feminism by contributing to the creation of an unsafe environment for its participants. Incels further retain power by continuing to exclude women from entering their spaces, such that they are able to move freely between the borders of digital subculture whilst ignoring online cultural rules governing spatialities.

The digitalization of mainstream Western feminism and incelism can be best understood through the theoretical framework of the new social movement theory. According to Staggenborg and Ramos, two key aspects of new social movement theory are cultural shifts and collective identity (2016). Digitalization has led to cultural shifts within these social movements, both within feminist ideologies, as well as in how movements interact with each other and acknowledge differential power dynamics. In accordance with the new social movement theory's claim of new grievances within post-industrial society (Staggenborg and Ramos 2016), digitalization has led to unprecedented cultural developments and social issues, such as the ideological expansion of feminism to uphold intersectionality and the issue of online spatial invasion by incels. Further, this cultural shift, through the accessibility and informal relations produced by digitalization, has led to the development of a collective identity. Academic language and ways of thinking, like intersectionality, have become a significant aspect of digital feminism and collective identity building by uniting smaller feminist groups together. This unification occurred through the informal and accessible knowledge networks provided by digitalization. This mobilization has, in turn, awakened new concerns for incels, who responded by expanding the confines of their countermovement through the spatial invasion of digital feminist spaces. New social movement theory, through its focus on cultural shifts and collective identity building, is able to theoretically capture and analyze the evolution of Western feminist and incel movements through digitalization.

However, new social movement theory's emphasis on distinguishing between "old" and "new" social movements fails to consider how historical relations between movement and countermovement impact the operations of modern social movements. There continue to be power differentials between digital feminists and incels as the latter engage in spatial invasions, which themselves are a product of the digital world being an extension of real-world gender hierarchies and the historic oppression of women and marginalized communities. This is because, as this paper has established, the reactionary

nature of incels stems from its history of centring men in relation to women's issues and ideological spaces. The present relationship between digital feminists and incels, wherein incels police digital feminist participation and act in opposition to digital feminists, would not exist without this history of ideological opposition, which existed before digitalization. This is important to consider as this impacts the functionality of digital feminism, and more broadly, the potential functionality of new social movements in relation to countermovements. The new social movement theory can capture the evolutionary growth of movements but is unable to connect movements' roots to their contemporary positionalities in relation to countermovements.

In conclusion, according to the new social movement theory, digitalization has led to cultural shifts and collective identity-making, significantly altering the developmental courses of feminism and incelism. In doing so, digitalization has enabled the development of collective action for both feminists and incels. Still, the history of the movements and their power differentials have led to digital incelism affecting the informal participation of digital feminists. Despite the increased democratization of mainstream Western feminism through digitalization, the virtual world reproduces gendered hierarchies as it acts as the digital extension of the patriarchal societies within which it exists. As such, incels continue to harness power over women by drawing on real-world gendered power differentials, thereby limiting the functionality of digital mainstream Western feminist spaces.

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Aborto y Activismo: Ni Una Menos and Abortion Policy in Argentina

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Abstract

On December 30, 2020, to the delight of activists and women's rights groups, the National Congress of Argentina legalized at-request abortion before 15 weeks of gestation. This historic decision was made possible by years of activism propelled by "Ni Una Menos," a grassroots feminist movement. Ni Una Menos drove the legalization of abortion by effectively mobilizing an established activist network and by framing abortion as a human right. The swift success of this movement has broader implications for the future of reproductive rights movements in Latin America and beyond.

Introduction

"¡ES LEY!" These were the cries heard outside the National Congress of Argentina on December 30, 2020, the day of the Senate's historic vote to legalize at-request abortion before 15 weeks of gestation following decades of activism (Amnesty International 2020). The passage of this bill was historic as it made Argentina one of the only nations in Latin America to protect reproductive freedom. Much of the activism for abortion access was centered in the feminist movement Ni Una Menos (Not One [Woman] Less) (Phillips, Booth, and Goñi 2020). This social rights movement emerged in 2015 as a protest against femicide and sexual violence, quickly broadening to include other social issues such as equal pay and abortion rights (Diaz 2021). What role did Ni Una Menos play in the successful 2020 legalization of abortion, especially in the face of long-standing religious pressures? By leveraging activist networks for mass mobilization and framing abortion as a human right, Ni Una Menos was able to increase public awareness about abortion and shift the narrative away from conservative anti-choice voices, driving legalization. This essay will first outline the Ni Una Menos movement and the historical context of Argentinian reproductive rights. This essay will then describe the role of Ni Una Menos network development for mobilization at both the individual and group level and will examine the movement's reframing of abortion. This essay argues that these factors brought power to feminist voices and influenced public perception, leading to legalization. In light of these findings, this essay will consider implications for reproductive freedom in Argentina and beyond.

Background

Ni Una Menos began on June 3, 2015, when more than 300,000 activists organized at the National Congress to protest rising femicides in Argentina (Lopreite 2022, 9). Similar protests soon sprung up across Latin America (Phillips, Booth, and Goñi 2020). Ni Una Menos quickly grew into a full-fledged movement, incorporating other demands like the legalization of abortion. Prior to the Ni Una Menos movement, abortion had been illegal in Argentina except in the case of rape or health concerns (Daby and Moseley 2021, 5). Organized movement for reproductive freedom began in the early 1980s with the democratization of Argentina, but continued to fail through to a 2018 Congressional vote (Lopreite 2022, 4). Anti-abortion sentiments have been entrenched in Argentinian society in large part due to pressure from the Catholic Church—more than 60 percent of Argentinians in 2019 identified as Catholic (Ceil Conicet 2019, 10)—and historical sexism. As Dagmara Szczepańska writes, “the matter of abortion needs to be considered from the perspective of a long-standing tradition of institutional female subjugation” (2019, 3). Prior to legalization, the Catholic Church and feminist activists existed within a massive power imbalance. However, in 2020, even in the face of heavy anti-choice pressure, a bill finally succeeded to the delight of activists worldwide (Phillips, Booth, and Goñi 2020). This radical shift demonstrated that an impressively organized force was able to shift power away from conservative, religious voices and towards the demands of women in Argentina.

Findings

By creating individual networks and connecting feminist organizations, Ni Una Menos was able to strengthen its organizational capacity for mass mobilization which ultimately drove legalization. From 2014 to 2019, the percentage of Argentinians who indicated that they had participated in a protest in the last 12 months grew from 9 percent to 13 percent (Daby and Moseley 2021, 17). Women were nearly twice as likely to have participated in a protest than men—a trend not seen before 2017 (Daby and Moseley 2021, 18). This suggests respondents were mobilizing specifically for Ni Una Menos (Daby and Moseley 2021, 18). Though these individuals were not necessarily mobilizing specifically for abortion issues, Ni Una Menos brought people to a larger conversation about feminism, gender, social equality, and reproductive freedoms (Daby and Moseley 2021, 12).

Mass mobilization for Ni Una Menos was also prominent in online circles. The movement originated online as a hashtag referring to “not one [woman] less” (Piatti-Crocker 2021, 7). The influence of Ni Una Menos could be seen in Facebook and Twitter threads, news articles, talk shows, radio programs, and even in green scarves (the color of the movement) worn by activists throughout the 2018 debates (Lopreite 2022, 9–10). Not only were these mobilizations numerous, but they were also impactful. As Daby and Moseley argue, “Participants ... were mobilized through social networks that provided the necessary information and organizational structure for overcoming the collective action barriers that had prevented abortion rights activism from emerging previously” (Daby and Moseley 2021, 10). This surmounting of barriers (a lack of communication and enthusiastic participants) through strong social media communication facilitated involvement in reproductive freedom mobilization. Forming these individual networks was vital for future abortion mobilization.

Many organizations participated in Ni Una Menos mobilizations, including student organizations, political groups, and labour unions (Szczepańska 2019, 10), creating connections between various activist groups and enhancing abortion advocacy. According to Szczepanska, “Ni Una Menos succeeded not only in raising awareness about women’s rights in Argentina, [but] it also united various heterogeneous organizations under one umbrella and created space, both physical and virtual, for discussion about different aspects related to gender and sexuality” (2019, 10). With the encouragement of Ni Una Menos, broader feminist social organizations such as Mala Junta and Libres del Sur mobilized members specifically for abortion activism (Daby and Moseley 2021, 11). These networks were vital for mass mobilization for reproductive freedom.

There is evidence to suggest that the mass mobilization from this network formation did contribute to abortion legalization. One organization, in particular, highlights the power of Ni Una Menos on abortion legalization: the National Campaign for the Right to Legal, Safe and Free Abortion. The Campaign was kickstarted in 2005 with the initial goal of legalizing abortion (Sutton and Borland 2019, 28). Participants authored and pushed for the Interrupción Voluntaria del Embarazo (IVE) bill in 2006 and continued to present it every two years until its passage in 2020 (Fierro and Vasco 2019). Although the Campaign conducted important and impactful work on its own, connecting with the Ni Una Menos networks was vital for its ultimate success. This is evident in the sweeping mobilization for the 2018 IVE debate: unlike in previous years, hundreds of thousands mobilized in support of the bill, many of whom were part of groups affiliated with Ni Una Menos (Szczepańska 2019, 11). Considering the uptake of this issue and legalization

by Congress soon after mobilizations, it seems that Ni Una Menos' protests encouraged legislative consideration of the issue (Szczepańska 2019, 11).

Statistical evidence also suggests the mass mobilizations of Ni Una Menos played a role in the shifting mindset on abortion issues. For one, the percentage of Argentinians who agreed that “a woman should have the right to abort whenever she chooses” jumped from 14.1 percent in 2008 to 27.3 percent in 2019 (Ceil Conicet 2019, 46). Additionally, research suggests that those who are engaged and interested in politics are most likely to be influenced by mobilizations (Zaller 1992). Statistical analysis demonstrates that the greatest shift for abortion support indeed occurred in those who were politically active (Daby and Moseley 2021, 21). This suggests that mobilizations played a role in driving abortion acceptance in Argentina. As Argentinian activist Giselle Carino expressed, the credit for abortion legalization goes to the women “who never stopped occupying the streets and the social networks—not even against the backdrop of the pandemic—and kept up their struggle, without haste but without rest” (Phillips, Booth, and Goñi 2020). To this point, in 2018, former president Cristina Fernández de Kirchner reversed her anti-abortion position, stating, “If you want to know who it was that made me change my mind, it was the thousands of girls who took over the streets. It was seeing them become true feminists” (Daby and Moseley 2021, 28). Both historical and empirical evidence suggests a shift of power away from the views of the Catholic Church and conservative voices and towards the aims of feminist activists, a shift which enhanced the push for abortion legalization in Argentina.

By taking up abortion rights as part of its platform, Ni Una Menos associated reproductive freedom with human rights, which also played a key role in legalization. Ni Una Menos began as a movement emphasizing the essential right of safety for women in the face of violence. In this sense, embracing reproductive freedom aligns abortion access with fundamental women's rights. Ni Una Menos activists also directly highlighted the necessity of abortions as a healthcare right, calling attention to stories of people who had been severely injured or killed because of inaccessibility (violating their rights to safety and life) (Boas et al. 2021). Ni Una Menos also called attention to the necessity of abortions for reducing economic gender inequality by providing women with the opportunity to have children only when they are financially capable (Boas et al. 2021). Elizabeth Friedman argues that a human rights frame like the one created by Ni Una Menos can “provide legitimacy to political demands, given both its political acceptance and its ‘machinery,’ or instruments for its realization” (2006, 480). This suggests that framing abortion as a human right was instrumental in contributing to its eventual legalization.

The human rights frame is particularly pertinent in Argentina, which faced international criticism for human rights abuses in the 1970s (Szczepańska 2019, 7). Politicians in Argentina through the 2000s placed particular emphasis on the importance of upholding human rights (Sutton and Borland 2019, 45). It comes as no surprise that encouraging Argentinians to conceive of abortion as a human right would push some to be more supportive of the cause. One study attempted to determine whether this reframing was in fact influential in the abortion rights movement in Argentina (Lopreite 2022, 7). This work determined that the human rights frame strengthens international solidarity, undermines the action of anti-abortion strategists, contributes directly to reframing the narrative surrounding abortion, and worked especially well in Argentina because of a strong national concern with human rights (Lopreite 2022, 7).

Scholars have questioned *Ni Una Menos* and suggested other factors responsible for the legalization of abortion. For one, the movement was not particularly successful in its original aim of reducing femicide. Though *Ni Una Menos* encouraged protests and social media conversations, it failed to translate into effective femicide policy (Piatti-Crocker 2021, 16–17). However, as this essay has shown, policy change has been achieved for abortion rights, and the mass mobilizations in Argentina appear to have facilitated this achievement. Perhaps effective femicide policy may be on the horizon, achievable on the coattails of an important feminist victory. Alternatively, regulating femicide via legal routes may also be more challenging than the matter of legalizing abortion. Some scholars have also suggested that partisan politics drive abortion legalization while others argue that abortion legalization came about due to the Catholic Church's weakening hold in Argentina (Daby and Moseley 2021, 4). Religiosity is indeed declining across all of Latin America (Lipka 2014), but there has yet to be a legalization wave across the region. More likely, the successful push for abortion legalization in Argentina consisted of many factors in a combination unique to the country—including favourable partisan positioning, evolving religious values, mass mobilization, and other factors like international influence.

Much can be learned from the success of *Ni Una Menos* in propelling the legalization of abortion rights in both Latin America and globally. Attention will be paid particularly to the United States, which is facing a tremendous challenge to reproductive freedom. *Ni Una Menos* has provided a useful framework for organizing similar movements in other nations. The success of a mobilized activist network suggests that similar organizers ought to consider the strength of digital networks moved to the physical space. For activists who are focused on communicating the importance of such issues, it may serve well to emphasize the importance of abortion as a right and to incorporate reproductive freedoms into other feminist activisms. It is

important to consider that the U.S. does not face the same challenge of femicide as Argentina, so this framing may have to consider other serious issues of gender equality. Additionally, the human rights frame may not be as pertinent in the United States. Instead, activists may consider an individual-rights frame, which is especially pertinent to the right wing (Boas et al. 2021). One final challenge is that the anti-abortion movement in America is tremendously organized with a very strong network. Paradoxically, reproductive freedom activists in the United States may have something to learn from their political counterparts.

Conclusion

Ni Una Menos played a key role in the legalization of abortion in Argentina by facilitating social networks for mass mobilization and by incorporating abortion into a human rights frame. By advocating at a mass scale and connecting across organizations, reproductive rights activists were able to bring attention to reproductive freedoms and encourage dialogue surrounding abortion, influencing social interpretations of abortion. By incorporating reproductive freedom into its goals, Ni Una Menos was able to frame them as a human rights issue, encouraging pro-choice activism and support. These findings suggest a potential framework for the legalization of abortion or protection of existing legalization in various countries. Though many factors contribute to the social perception of abortion—historical attitudes, institutional treatment of women, activism rates, religion, and more—attitude shifts can be brought about through collective action and appropriate framing. Ni Una Menos proves that feminist change can be conducted at a mass scale relatively quickly and may provide a framework that serves as an inspiration for future feminist activists.

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An Inquiry into Same-Sex Intimate Partner Violence and the Inapplicability of Battered Woman Syndrome for Same-Sex Violence Cases within Claims of Self-Defense

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In 1985, Canada introduced section 34 (S. 34) of the *Criminal Code* concerning the defence of a person, which allows defendants to utilize the implication of self-defence as a viable method of defending oneself from being found guilty of a violent crime. Yet, S. 34 employs a highly restrictive nature on all individuals claiming self-defence when charged with murder. Over the years, this restrictive nature has garnered much criticism, specifically regarding the wide inability of many to utilize the defence. Much of this criticism originates from the historical inability of battered women to utilize this defence when they take the life of their repeatedly abusive male partners, but this all changed in 1990 when the Supreme Court made the landmark decision in *R. v. Lavallee* to allow “battered woman syndrome” as a legitimate extension of self-defence. Although this decision was largely beneficial and progressive, it did not eliminate substantial problems within Canadian self-defence laws.

Further, regardless of prevailing media portrayal, same-sex intimate partner violence remains just as prevalent and critical an issue as male-on-female heterosexual domestic violence. This has ultimately led to many scholars questioning whether battered woman syndrome should be altered or if other sociological, less gendered psychological factors should be considered when assessing self-defence claims within cases of same-sex intimate partner violence resulting in death. Throughout this paper, I will argue that it is imperative that claims of self-defence involving domestic violence incorporate testimony and evidence that go beyond battered woman syndrome, as the current incorporation of battered woman syndrome into self-defence laws hinders the utilization of self-defence for abused homosexual individuals that kill their abusive same-sex partners. In proving this, I will demonstrate that Canadian laws should take into consideration the sociological and non-gender related psychological factors when assessing same-sex self-defence claims, as the highly gendered language and research behind battered woman syndrome, paired with the exclusively psychological nature of the syndrome, unjustly narrows the scope of the already restrictive self-defence laws in Canada.

Prior to delving into arguments regarding the usefulness of battered woman syndrome, it is important to first define domestic violence. Domestic violence is a type of intimate partner violence, not limited to heterosexual

individuals—as this type of abuse does not discriminate based on marital status, sexual orientation, or gender identity—that manifests in either emotional, psychological, or physical harm (Pertnoy 2012, 546). With this, much of the domestic violence cases that are broadcasted to the public seem to exclusively portray repeated husband-on-wife violence, but behind the broadcasts, it is generally accepted that domestic violence in homosexual relationships occurs in similar proportions to violence in heterosexual relationships (Pertnoy 2012, 554). For instance, in a Virginia-based study on same-sex domestic violence, it was found that 56.1% of respondents in same-sex relationships reported experiencing some type of domestic violence incident at least once in the past, with around 25% reporting that they had been physically abused by a same-sex intimate partner in the past (Owen and Burke 2004, 130). Further, it becomes unquestionable that intimate partner violence is just as substantial an issue for homosexual individuals as it is for heterosexual women, as respondent testimony from a second study suggests that both groups of individuals report a similar frequency of domestic violence incidents (Owen and Burke 2004, 131). In addition to this, it is important to establish some of the critical issues within existing Canadian self-defence laws.

S. 34 declares that an individual's homicide charges may be excused if they were reasonably acting in self-defence. However, it is not as simple as this, as the section lays out nine factors that must be taken into consideration. For the purposes of this paper, we will only discuss issues within S. 34.2(b) and S. 34.2(e). S. 34.2(b) states that in determining whether the act of self-defence was reasonable, the court shall consider the extent to which the use of force was imminent and whether there were other means available to respond to the potential use of force (Roach 2018, 363). This becomes an issue as battered individuals that have endured continuing violence within long-term intimate relationships often respond to threats of violence or repeated violence by pre-emptive action at the time in which they were not being attacked, or more specifically when their abusive partner was vulnerable (Watson 2021a). Ultimately, because of the imminence element, this component within self-defence carried out by battered individuals is completely ignored, leaving the law in need to expand the notion of self-defence beyond this factor. Further, S. 34.2(e) also involves factors relating to size, age, gender, and physical capabilities of the parties to the incident (Roach 2018, 363). Issues within this factor will be discussed at great length in the following section.

The overall gender-specific nature of both self-defence laws and battered woman syndrome ultimately restricts their applicability to those within violent and abusive same-sex relationships. As previously mentioned, S. 34.2(e) has several problematic qualities relating to the factors that must be

taken into consideration: gender, size, and physical capabilities of both parties to the incident. Ultimately, these factors can often aid heterosexual battered women in claiming self-defence, as they are often smaller in size and have fewer physical advantages over their abusive partners; this, unfortunately, poses a problem for homosexual battered individuals, as they are the same gender and often of a similar size and physical ability as their abusive intimate partners. Consequently, courts may be able to imply that battered homosexual individuals could have fought back against their abusive partners and avoided committing homicide, in a way that heterosexual battered women are often unable to. This implication brought on by self-defence laws ignores the larger psychological and sociological explanations of domestic violence. In addition to the problematic factors within self-defence law, the use of battered woman syndrome in cases of self-defence ultimately restricts the applicability of self-defence to battered homosexual individuals, due to the highly gendered nature of the syndrome itself. For instance, battered woman syndrome often tends to promote harmful stereotypes that the traditional battered woman is weak or dependent on a man, posing a substantial issue for homosexual defendants who not only have to prove their innocence, but also have to attempt to fit themselves within the stereotype of a victimized, passive, dependent, battered 'woman' in order to have their claims of self-defence fairly judged (Ahumada 2012, 155). This ultimately forces experts to somehow fit the defendant into this box set out by battered woman syndrome, leaving juries spending more time attempting to assign parties of the incident a stereotypical gender role, rather than focusing on the facts (Pertnoy 2012, 566). Further, because of the gender-specific nature of battered woman syndrome, its use can often hinder homosexual individuals' claims of self-defence overall, unjustly leaving many of these individuals without a defence at all. Moreover, this highly gender-specific nature of battered woman syndrome plays into further substantial issues within the syndrome itself that will be discussed in the following paragraph.

Not only is battered woman syndrome extremely gendered but it is also a heavily psychological-based concept that reduces the killing of abusive intimate partners down to a sort of pathological defect unique to the heterosexual female mind. Ultimately, this hinders battered homosexual individuals from utilizing the impacts of repeated battering within self-defence claims. It is important to illustrate exactly what Dr. Lenore Walker's battered woman syndrome entails in its entirety. Walker's theory consists of two parts: a cycle of violence and a social learning theory of learned helplessness (Bricker 1993, 1418). The cycle of violence consists of three phases: the tension building phase involving minor abusive incidents, the acute battering phase involving instances of uncontrollable, explosive violence from the abuser, and the loving contrition phase, in which the abuser

becomes apologetic and caring (Bricker 1993, 1418). The theory of learned helplessness explains that the battered woman often feels a loss of control that contributes to why she feels she simply cannot leave the abusive relationship (Bricker 1993, 1418).

Ultimately, both aspects of battered woman syndrome are highly psychological in their nature, which poses a major issue. Regardless of the syndrome's initial attempt to explain a "terrified human being's response to an abnormal and dangerous situation" (Noonan 1993, 253), the use of the syndrome in court often instead characterizes the effects of sustained brutality as signs of mental illness, as denoted by the term "syndrome" (Bricker 1993, 1418). Battered homosexual defendants attempting to use the syndrome may be unable to do so. If they do not exhibit some or all of the "heterosexual female-specific symptoms" of a battered individual, juries may not see them as such, shifting the focus of the case from whether the defendant's actions were reasonable given the circumstances, to whether the defendant is entitled to call himself or herself a battered woman at all (Bricker 1993, 1428).

In addition, the female-specific psychological state exhibited within the syndrome—namely the fact that Walker's definition of the syndrome is of a woman being battered by a man—ignores the fact that the psychological effects experienced by battered women exist in any relationship involving repeated battering, whether homosexual or heterosexual (Dupps 1990, 880). For instance, in a study on battered lesbians, it was discovered that many of the psychological effects, such as fear, hope or isolation, encountered by battered heterosexual women are felt in the same manner by battered lesbians (Dupps 1990, 896). Further, because of the great deal of focus on the female mind, battered woman syndrome ignores the fact that homosexual individuals may experience greater negative psychological effects of repeated battering than heterosexual women, such as increased isolation and fear of their sexual or gender identity being revealed (Dupps 1990, 899). Overall, although there is a plethora of evidence that all battered individuals endure similar types of psychological effects, the female-specific psychological nature of battered woman syndrome hinders juries from perceiving these effects in homosexual individuals.

Though battered woman syndrome is a gendered and psychological concept, it arguably remains extremely important and useful, even for battered homosexual individuals, if the court is made aware of the "dated" and gendered terminology within the syndrome. With this, regardless of the argument that battered woman syndrome reinforces stereotypes of women, making it inapplicable to homosexual individuals, many scholars argue that the reinforcement of these stereotypes can be helpful in explaining why a battered individual kills their abusive partner. One of the main reasons for this is explored by Gena Hatcher, who argues that "the origins of battered woman

syndrome indicate that expert testimony reflecting the history and traditional assumptions regarding the subordination and battering of women was necessary in order for juries to adequately understand women's responses" (2003, 44). This means that the ordinary person—who sits in juries—often holds misconceptions and stereotypes regarding women. Therefore, the only way to ensure that they grasp the effects of repeated battering is through the enforcement of these stereotypes. Further, we can confidently say that much of the public carries similar misconceptions and stereotypes of homosexual individuals, as they do of women, meaning that battered woman syndrome, regardless of its presentation as a gendered concept, applies to any battered person within a marginalized or oppressed group.

Ultimately, the only aspect of battered woman syndrome that hinders its applicability to homosexual individuals is the word "woman," so with the omission of the word, it becomes evident that much of the stereotyping within the syndrome applies to all oppressed individuals, rather than only women. Moreover, battered woman syndrome, through this reinforcement of these stereotypes, remains the primary component of explaining the behaviour of any battered marginalized individual to a jury, and until we eviscerate these stereotypes within society, it will remain critical for understanding the actions of both battered heterosexual women and battered homosexuals (Hatcher 2003, 44).

Regardless of the arguments of the aforementioned scholars, the psychological and gender-specific nature of battered woman syndrome largely hinders its applicability to homosexual defendants' claims of self-defence, which is why both sociological and broad psychological models need to be incorporated into self-defence laws. To rebut Hatcher's claims, not only is battered woman syndrome's reliance on stereotypes of women outdated, but it also seems to ignore social factors that play a larger role in a defendant killing their abusive partner (Noonan 1993, 254). This is not to say that the psychological effects set out in battered woman syndrome are irrelevant, as the broad psychological effects can be applied to any battered defendant and are important in aiding juries in understanding why an individual committed the act in question. As previously mentioned, same-sex intimate partner violence occurs at a similar rate, in a very similar fashion to heterosexual intimate partner violence, so it remains imperative that expert testimony on the cyclical nature of the violence set out by Walker remains included in battered homosexual defendants' claims of self-defence. This is illustrated in a 2016 study, which suggested that expert testimony on the psychological effects of repeated battering aided juries in forming a more well-rounded understanding of why the individual's actions were reasonable given their perception of danger (Watson 2021b). Regardless, the cyclical nature of domestic violence is not the only relevant testimony within cases of domestic

violence, as testimony on the sociological factors relating to domestic violence can also better explain claims of self-defence and provide homosexual defendants with the same advantages as heterosexual battered women.

Within any abusive relationship, there are many sociological factors such as codependency, community isolation, children's welfare, or prior history of abuse. Battered homosexual individuals often face more sociological pressures such as isolation due to homophobia, fear of being 'outed,' and higher levels of co-dependency (Murray 2008, 14-15). These sociological factors can provide an explanation as to why battered individuals feel that they are unable to simply leave abusive relationships, since they often feel "trapped" within constraints set out by society. Further, in introducing testimony on sociological factors, juries can understand a key reason why battered homosexuals killing their abuser may have been more reasonable than leaving their abuser. Regarding the importance of both psychology and sociology to homosexual battered individuals' claims of self-defence, many scholars argue that broad psychological and sociological models of battered individuals may not be fully compatible. This is indubitably untrue, as sociological testimony plays directly into Walker's learned helplessness theory. These factors provide a fuller explanation for why an individual may feel helpless throughout the relationship. Ultimately, it seems that sociological and broad gender-neutral psychological models not only complement one another but also strengthen one another's claims regarding battered individuals' claims of self-defence, making them more than compatible. Moreover, it is evident that to employ a more applicable defence for homosexual battered individuals that kill their abusive same-sex partner, a less gendered and broader psychological model must be paired with a sociological model of domestic violence.

Overall, it is extremely important that gender-based stereotyping and pathologizing are eliminated within battered woman syndrome to prevent it from hindering battered homosexual individuals' claims of self-defence. Moreover, in exploring both the shortcomings and importance of battered woman syndrome, as well as the importance of sociological factors within domestic violence, it is evident that a gender-neutral socio-psychological theory of intimate partner violence must be utilized within cases of battered homosexual individuals killing their abusive partners. In doing so, these individuals can be provided with a fair and just trial.

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Growth Versus Progress in Economics: How Using GPI Instead of GDP Can Promote Effective Environmental Policy and Motivate Pro-Environmental Attitudes

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There may be no other field as influential to government decision-making as the study of economics. Originally, the term ‘economics’ stems from the Greek term ‘Oikonomia,’ which translates to the management of the household or community (Leshem 2016). However, the modern state of market-based economics seems to have deviated significantly from the field’s original focus and is arguably more akin to chrematistics, the art of making a profit (Hathway & Boff 2009). This loss of focus in the field of economics is perhaps best illustrated by the metric of Gross Domestic Product (GDP). GDP is generally considered the standard measure for governments and organizations to gauge the economic performance of a nation (Weeks 2019). In the midst of the growing ecological crisis, evaluating the validity of a metric as influential as GDP is essential. As Nobel prize-winning economists Joseph Stiglitz and Amartya Sen eloquently state in their book on GDP, “What we measure affects what we do; and if our measurements are flawed, decisions may be distorted” (2010, 2). The goal of this paper is to evaluate GDP as an economic metric of well-being and compare it to the newly developed alternative Genuine Progress Indicator (GPI). First, the history and development of GDP will be presented, followed by a discussion of how the prominence of GDP influences decision-making within governments and an evaluation of the shortcomings associated with it. Then, the metric of GPI will be introduced as an alternative to GDP followed by an analysis of how using GPI instead of GDP to measure societal progress can promote effective environmental policy and motivate pro-environmental attitudes.

In order to analyze the validity of GDP as an economic metric, it is imperative to first understand the context behind its development and how it came to be so influential. As defined by the Organisation for Economic Co-Operation and Development (OECD), GDP is “the standard measure of the value added created through the production of goods and services in a country during a certain period” (2021). GDP predominantly sums up three macroeconomic elements: consumption, investment, and spending by government bodies (Breslow 1996). The idea of GDP is largely credited to well-known Russian economist Simon Kuznets (Weeks 2019). His 1934 report titled *National Income, 1929-1932* was commissioned by the United States government with the goal of measuring the American economy based on the nation’s income (Weeks 2019). Kuznets’ idea for a system of national

accounting for the U.S. directly led to the development of GDP as a widely used metric. It is also important to note that similar processes of national accounting were occurring in the United Kingdom at the same time, with economist Richard Stone at the forefront (Fox 2012). Kuznets' original goal with his paper was not to create a metric of well-being, but rather one for policymakers to gauge their nation's economic capacity (Bove 2021). In fact, Kuznets dedicates an entire section in his original paper to warning the reader about misusing the data, titled "Uses and Abuses of National Income Measurements" (1934, 5–7). In this section, one of the main themes he communicates is that these quantities should not be treated as a direct measurement of well-being or even the productivity of a nation because of the numerous assumptions that play into computing such a quantity in the first place (Kuznets 1934, 5–7). Kuznets' original concerns will be discussed in greater detail when evaluating the shortcomings of GDP. Despite Kuznets' apprehensions, politicians and economists developed a fondness for GDP because of its simplicity (Bove 2021). It allowed governments to compare their nation's economic performance year to year with a single metric.

In the 1940s, GDP was adopted by the International Monetary Fund (IMF) and the World Bank as the principal indicator of economic growth, further establishing its relevance (Fox 2012). GDP's legitimacy as a metric was additionally supported by American economist and professor at Yale University Arthur Melvin Okun. His 1962 essay *Potential GNP: Its Measurement and Significance* presented an empirical observation that a rise in GDP is accompanied by a fall in unemployment. This phenomenon, known as Okun's law, likely contributed to the overarching trend of GDP being regarded as a measurement of well-being rather than one of economic capacity. In 1993, China became the last major country to use GDP and consequently, the measurement became the official global standard for comparing the performances of different economies worldwide (Bove 2021). In due time, GDP became the predominant designer of policy, as illustrated by economist Joseph E. Stiglitz: "Good economic policy was taken to be whatever increased GDP the most" (2020). As a result of its historical context, GDP remains an influential instrument in modern governmental policymaking.

In order to understand the role that GDP plays in relation to environmental issues and the ecological crisis, it is crucial to understand how GDP influences environmental policy. As aforementioned, policymaking in many nations has largely become oriented around what can maximize GDP. This is damaging to environmental policy because GDP is based heavily on transactional activity, implying that environmental effects such as climate change are merely regarded as economic externalities (Bove 2021). This notion is somewhat counterintuitive considering that phenomena like climate

change will certainly have impacts on economies in the coming decades, yet GDP is incapable of factoring in such consequences. Furthermore, GDP conflates all sorts of economic activity as ‘growth’ and therefore categorizes it as favourable (National Film Board 2016). The result of this conflation is that tragic catastrophes such as hurricanes and the opioid crisis are increasing GDP because of the costs associated with the management and recovery processes (Stiglitz 2020). Additionally, because of the nature by which GDP is tabulated, the push to increase it represents an attempt to maximize production and consumption (Talbert, Cobb, and Slattery 2006).

This likely explains why countries like the United States have been on an exponentially increasing production and consumption binge since GDP was widely adopted in the 1950s (Anielski 1999). Economist Victor Lebow understood the inseparability of GDP growth and consumerism when it was in its early stages, he stated in 1955: “Our enormously productive economy demands that we make consumption our way of life” (Suzuki 2018). This philosophy is inherently harmful to environmental policy as it prompts people to view the natural world as a source of materials for consumption rather than an integrated ecosystem that we depend upon. Thus, policy that strives to maximize GDP is policy that aims to create a culture that is both ignorant toward environmental issues and dominated by consumerism, which is unquestionably incompatible with sustainability movements and pro-environmental policy.

In addition to how GDP influences environmental policy, there are several shortcomings associated with GDP as a metric itself. As previously stated, the accredited developer of the idea of GDP, Simon Kuznets, acknowledged several shortcomings of the national income measurement in his original paper. He first warns of the human capacity to oversimplify situations and claims that the national income metric should be treated with a degree of uncertainty (Kuznets 1934, 5–6). He follows this up by stating that treating the measurement of national income as a direct measurement of social welfare carries many assumptions and is likely to be unrealistic (Kuznets 1934, 7). Irrespective of Kuznets’ cautions, it is imperative to evaluate GDP as a metric of well-being since it is often regarded as such by economists and policymakers. Since GDP considers all types of economic activity as beneficial, this implies that there is no distinction between sustainable and unsustainable economic transactions, nor is there consideration of how certain economic transactions may affect the well-being of communities.

Examples of how GDP fails to properly gauge well-being are plentiful. GDP often remarks natural disasters from climate change as positive because they lead to government spending on relief and rebuilding infrastructure, as well as increased spending by disaster victims to replace lost property (Bove 2021). In fact, environmental externalities like pollution can be considered as

a ‘double benefit’ for GDP because of the financial transactions associated with the original polluting activity as well as the clean-up (Talbert, Cobb, and Slattery 2006). To GDP, these are all monetary expenses and thus are beneficial to the economy, with little to no consideration of the trauma and distress endured by disaster victims. Economist Marc Anielski perhaps best summarized the flawed nature of GDP in his paper with a satirical quote: “The ideal economic or GDP hero is a chain-smoking terminal cancer patient going through an expensive divorce whose car is totalled in a 20-car pileup, while munching on fast-take-out-food and chatting on a cell phone” (1999, 2).

In addition to GDP’s misleading quantification of well-being, policy focused on GDP growth may also be detrimental to a state in the long term. Policymakers often focus on the change in GDP from year to year, but Stiglitz claims that it is actually more important to question whether or not the economic growth occurring is sustainable (2020). Since GDP is assessed on a yearly basis, the drive to increase it in the short term fails to distinguish between economic activity that can be sustained in the long term versus that which may only be beneficial for the near future. In fact, the question of sustainability is important with regard to the renowned Okun’s Law as well. Although empirical observation does indeed support that a rising GDP is affiliated with job creation, the focus should perhaps be oriented more towards questioning the types of jobs being created rather than equating all sorts of job creation as equally beneficial (Bove 2021). Evidently, treating GDP as a metric of well-being for a nation is a dangerous practice that may be beneficial in the short-term, but potentially deleterious in the long run.

The continual growth of GDP for many nations in the midst of countless social and ecological problems undoubtedly raises questions about the validity of relying upon such a measurement to gauge social welfare. In reaction to GDP’s prominence, many initiatives to replace it with a new index have surfaced. One of the leading alternatives to GDP is the Genuine Progress Indicator (GPI), which was developed by a national policy institute named Redefining Progress (Breslow 1996). GPI was created in 1994 by economist Clifford Cobb alongside his colleagues Ted Halstead and Jonathan Rowe (Anielski 1999). The aim of GPI was to shift the focus toward sustainable economic welfare rather than pure economic growth (Talbert, Cobb, and Slattery 2006). Although the exact calculation is based on 26 different indicators (Hayes 2021), the basic methodology of GPI is to start with the personal consumption data from GDP, then make appropriate deductions based on harmful factors such as income inequality, costs of crime, environmental degradation, and loss of leisure time (Talbert, Cobb, and Slattery 2006). Sequentially, additions are made based on beneficial factors like public infrastructure, volunteering, and housework (Talbert, Cobb, and Slattery 2006). The GPI, in some sense, is simply a modified version of GDP

that seeks to account for whether or not the progress being made on a macroeconomic scale is sustainable. Since its development, GPI has gained notability in rivalling GDP, with states such as Maryland, Oregon, Washington, Colorado, Hawaii, and Vermont already using the metric to help inform policy (Ceroni 2014). GPI is significant as an alternative to GDP because it displays a vastly different trajectory. While GDP increases almost every year in nations like the United States (The World Bank 2020), GPI indicates that the American economy improved until around 1973, then hit somewhat of a turning point and began its gradual decline (Anielski 1999). In fact, by 1994, the U.S. GPI was 26 percent lower than it was in 1973, and on a per capita basis, it had decreased by 42 percent (Breslow 1996). Overall, GPI provides a different perspective on macroeconomics, indicating that perpetual economic growth for its own sake may not always be purely beneficial.

In the comparison between GDP and GPI as economic metrics of well-being, it is clear that GDP presents numerous shortcomings with regard to inciting pro-environmental action or policy. In some ways, GPI seeks to address these environmental shortcomings and motivate pro-environmental attitudes. While GDP-oriented policy attempts to maximize material production and consumption, GPI strives to create a more sustainable economy by minimizing material throughput (Talbert, Cobb, and Slattery 2006). For example, one of the main reasons why the GPI in the United States is declining while GDP continues to increase is due to the negative costs from the depletion of non-renewable resources, like fossil fuels, that GDP fails to account for (Anielski 1999). Furthermore, GPI attempts to define a nation's progress through a social perspective as well. The second largest negative adjustment within the GPI metric is the measure of income inequality (Breslow 1996), which, as economist Thomas Piketty strongly emphasizes in his book *Capital and Ideology*, has been drastically increasing since the great economic transitions that took place under Ronald Reagan and Margaret Thatcher (2020). This aspect of GPI is also significant for environmental movements because as there is an intrinsic connection between issues of environmental justice and those of social justice, the forms of discrimination are arguably inseparable (Cornish 2020). Therefore, the corrections that GPI makes to the GDP measurement for social and environmental issues both imply that GPI would be a notably better tool to motivate pro-environmental action than the currently used GDP. It is also important to consider that GPI is very much a novel concept in comparison to GDP. While GDP's influence has permeated through economic research and policymaking for decades, GPI is just beginning to garner support and attain prominence within such fields. Thus, as GPI gains relevance within economic research and government bodies, there is potential for economists and policymakers to reorient their focus toward policy that elevates GPI as opposed to GDP. However, it is

crucial to acknowledge that GPI itself is not an all-encompassing perfect metric and there exist critiques towards it as well. For instance, GPI has been criticized for potentially underestimating the social costs of different issues and overestimating the environmental cost (Breslow 1996). Nonetheless, the GPI is a laudable concept that attempts to redirect the priorities of governments and policymakers away from growth-based economics and toward social well-being and progress that can actually be sustained.

Ultimately, although the era dominated by Gross Domestic Product has been accompanied by a momentous rise in global living standards (Fox 2012), it is evident that GDP-based approaches are no longer sufficient for guiding economic and environmental policy. As cautioned by its creator Simon Kuznets, GDP has demonstrated countless examples of its inability to properly quantify the severity of environmental and social issues. In the midst of rapidly growing inequality (Piketty 2020) and the ever-intensifying climate crisis, other macroeconomic measurements need to be considered to ensure that the prosperity achieved in the GDP era is not a momentary flash, but rather a continuous state that can be sustained for generations. Redefining Progress' Genuine Progress Indicator presents itself as a metric that integrates the intuition provided by Kuznets' GDP measurement and builds on it by factoring in the long-term trajectory of the economy and the well-being of the members of society. Though its limitations should not be neglected, GPI serves as a viable alternative to GDP that would certainly help governments productively address issues of social and environmental justice whilst assuring that the progress the nation attains can be preserved. Philosophically, the use of GPI over GDP represents a paradigm shift in economics that has the potential to redirect the focus of the discipline away from chrematistics and back to its inception of caring for the household, the community, or for the case of macroeconomics, entire nations and the planet that sustains them.

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Ordering International Relations in the Age of Empire

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***Imagined Communities* and the Foundations of Albanian Nationalism**

In *Imagined Communities*, Benedict Anderson credits print capitalism with the manifestation of nationalist thought (2016, 36). Mass publication and an expanding printing press industry allowed for mediums like daily newspapers to create a shared sense of experience amongst the reading members of a community. Through this process, a central language, typically the vernacular, became widely used by all strata of society. Anderson also posits that, as a reaction to the popular nationalism that spread through print capitalism, elites of multi-ethnic empires appropriated such sentiment into state nationalist programs to retain elements of empire in a world of rapidly developing nation-states (2016, 86). Owing to low literacy rates, factionalism, and the special privileges afforded to them by the Sublime Porte, nationalism was negligible in Albania until the early twentieth century, despite deep cultural roots. This essay will investigate the degree to which the influence of imperial powers accelerated Albanian nationalism in the early twentieth century through the processes described by Anderson, namely official nationalism and print capitalism. Only after a number of policies undertaken by the Ottoman Empire, Austria-Hungary, and Italy did Albanian culture transform into a powerful yearning for a nationally defined, sovereign state. Albanian independence emerged from the old, imperial international order's absorption of the nation-state model and, accordingly, its creation acted as an impetus for World War I.

Official Nationalism and Imperial Adaptations: From Pan-Islamism to Neo-Ottomanism

Anderson refers to official nationalism as an appropriation of popular nationalist sentiment by dynastic powers and elites to preserve the old order of empires (2016, 86). However, these adaptations frequently failed and spurred greater revolts against imperialist rule (Anderson 2016, 106). During the nineteenth century, the Ottoman Empire grew concerned by the budding nationalism developing across its polyglot, multi-ethnic territory. The Sublime Porte began initiating policies to prevent the materialization of ethnic-based communities with patriotic convictions. These programs had the ultimate effect of pushing Albanian cultural protectionism into a politically charged and distinctly national movement.

Regarding Ottoman hostility, Albania's Founding Father Ismail Qemali described Albania's independence as a relief after they "suffered so terribly under the yoke of five hundred years of Turkish rule" (1912). Here, Qemali portrayed Albania as a longstanding victim of Turkish cruelty. Although there were instances of oppression, there were many prominent Albanians who rose to high-ranking government and military positions over the centuries. Most Albanian nationalists, Qemali included, were at first more favourable to autonomy under Ottoman suzerainty than full independence. Only a decade earlier, Qemali wrote of the Albanians as "a noble savage community which required the protection of a benevolent Ottoman Empire," refusing to break ties with the Sublime Porte (Qemali 1920, as cited in Fischer 2014, 33). However, the desire and plausibility of suzerainty eroded due to the extensive use of Ottoman official nationalism in the early twentieth century, hardening the anti-Turkish narrative upon independence.

Witnessing the nationalizing Slavic populations to the north and frustrated by the reinforced religious divide, the Albanian patriots demanded greater recognition and autonomy under the protection of the Ottoman Empire. When the Albanians seized Uskub and parts of Novi Pazar in 1881, the Ottoman Empire encountered the first instance of nationalist resistance amongst their Muslim population (Vickers 2013, 41). The revolt was quickly put down and Abdul Hamid II more aggressively pursued policies of Pan-Islamism (Vickers 2013, 41). In conjunction with the Greek Orthodox Church's Panhellenism, Pan-Islamism forced Albanian schooling and publications to be produced in Greek or Turkish, respectively (Skëndi 1967, 19). As the petition put forward by the Albanian patriots in 1898 read, "We must say the greatest enemy of Albania is the Sublime Porte! The government permits in the territory of Albania the foundation of Bulgarian, Serbian, and Greek schools and denies them to us." This emphasized the hindrance religious identity circles posed for the Albanians (Schirò 1904, as cited by Skëndi 1967, 131). By 1902, possession of an Albanian book or use of the Albanian language in official correspondence became illegal (Skëndi 1967, 144). The use of Panhellenism and Pan-Islamism by religious sects to unite Ottoman-occupied groups could be viewed as a last grasp to sustain the empire in its traditional form. However, notions of self-determination based on ethnicity and the homogenized nation-state model were rapidly spreading into the Balkan region which undermined the efficacy of Panhellenism and Pan-Islamism for religiously diverse groups like the Albanians.

When the Young Turks came to power in 1908, they promised the Albanians reduced taxation, full constitutional rights, and the creation of Albanian-language schools in exchange for military assistance (Skëndi 1967, 54). Contrary to their vows, the Young Turks' desire to integrate elements of the traditional empire into the nation-state model required both aggressive

nationalizing and centralizing policies (Fischer 2014, 34). Middle Eastern historian Nader Sohrabi describes the Young Turks' approach to the ethnicity problem as "neo-Ottomanist" (2018). He contends that the Young Turks were "revolutionary nationalists, but reluctant ones" who "wanted to preserve empire, but one that resembled a nation-state – more integrated, more homogeneous, and inline" (Sohrabi 2018, 836). Unlike Pan-Islamism which bound citizenry through shared religion, the Turkish language became "the common currency of the empire" (Sohrabi 2018, 840). It retained elements of the Ottoman Empire's promotion of religious communities while making Turkism the core civic identity of the people (Sohrabi 2018, 841). The Young Turks also enacted centralizing policies to end the inequalities associated with the old regime. For the Albanian Muslims, this meant the abolition of all tax and military privileges, the replacement of local laws with state ones, as well as the relinquishment of their right to bear arms (Sohrabi 2018, 851). These reforms targeted the northern Muslim Albanians who were previously content with the old order of the Ottoman Empire, and they too began resisting Turkish chauvinism by putting forward demands for autonomy (Erickson and Hall 2001, 8). The Young Turks' attempt to adapt the pillars of the traditional empire into the framework of an imperial nation-state via neo-Ottomanism and centralization transformed the Albanian patriots' position from desiring suzerainty to demanding sovereignty.

While official nationalism through Pan-Islamism and neo-Ottomanism was intended to consolidate loyalty within the Ottoman Empire, the policies pursued had the opposite effect on the Albanians—much like Anderson's theory forecasts. Albanian revolts not only signaled the decline of Ottoman power in Europe but weakened the Turks' legitimacy as a nation-state. Severing their relationship with the Empire and its former vilayet system, the Albanian identity became grounded in an ethnic nationalism rather than a religious one. Importantly, resistance to the official nationalist programs of the Turkish and Greek agents fundamentally shifted Albanian nationalist ambitions Westward, towards Austria-Hungary and Italy.

Print Capitalism and Imperial Rivalry: The "Peaceful Penetrations" of Austria-Hungary and Italy

Anderson centres his theory of nationalism on the development of print capitalism. The use of "national print-languages" established a community of vernacular readers who consumed ideas of ethnicity, sovereignty, and nationalism through mass production (Anderson 2016, 46). With a small reading class (less than 2% were literate by 1908) and stringent limitations imposed by the Ottoman Empire, print capitalism seemed unlikely to spawn in Albania (Fischer 2014, 27). Nevertheless, just as the Ottoman

Empire and the Greek Orthodox Church sought to restrict Albanian language use to retain control over their empires, Austria-Hungary and Italy aimed to strengthen the Albanian national presence as a means to secure the vitality of their spheres of influence. Austria-Hungary and Italy initiated a series of “peaceful penetrations,” as Skëndi describes them, in the form of infrastructure and education projects in Albania (1967, 265). Imperial rivalry for prestige and territory in an increasingly nationalizing world order was personified by the Albanian independence project whereby the interests of the traditional empire intersected with the ideals and practices of nationalism.

The Austrians were the first to employ print capitalism to transform Albanian culture into a nationalist campaign that satisfied their own geopolitical interests. Since the Albanians were located on a strategic section of the Adriatic, Austrian Foreign Affairs Minister Agenor Goluchowski saw “a vital interest that [Albania] should not fall under foreign influence,” referring primarily to the Serb-Russian axis of influence which desired access to the coast (Goluchowski to Calice 1897, as cited by Skëndi 1967, 243). Through a process of “pirating,” as Anderson deems, the Austrians imported features of successful national projects into Albania such as education, mass publication, and welfare development (2016, 81). Under the auspices of the 1616 Treaty of Vienna, Austria-Hungary was permitted to establish religious institutions and publications for the Catholic Albanians (Skëndi 1967, 128). Starting in the 1850s, Austria-Hungary founded Albanian-language schools, subsidized publishing, and built orphanages and hospitals (Skëndi 1967, 261). Despite their best efforts, the use of three different alphabets by the Albanians hindered the spread of print capitalism even amongst the small reading public (Skëndi 1967, 275). Hoping to extend its influence outside of the Catholic north, Austria-Hungary wanted the Albanian nationals to designate Latin as the official alphabet. At the 1908 Monastir Congress, the Latin alphabet was adopted (Vickers 2013, 55). As poet Andon Zako Çajupi saw it, the Greek and Arabic alphabets had “often been written in blood instead of ink” and regarded Latin as a means to distance Albanians from the Porte and the Orthodox Church’s control (Çajupi 1957, as cited by Skëndi 1967, 140-141). Additionally, the Latin alphabet was widely available for printing presses, making it a better medium to spread nationalist texts. Although Albanians were suspicious of Austrian motives, they appreciated Austrian efforts to enhance social welfare and promote the Albanian language (Vickers 2013, 40).

Italy had its own prestige interests at stake and saw the ethnic linkage between the Italo-Albanians (who immigrated to the Italian coast in the 15th century) and the Albanians as a legitimate justification for imperial involvement in the region (Fischer 2014, 28). Having more cultural freedom than the domestic Albanians, the Italo-Albanians, known as the Arbëreshë,

established a Pan-Albanian literary society and newspapers in Southern Italy (Skëndi 1967, 215-218). Initially, their focus was on promoting an authentic cultural revivalism since they resented Turkish censorship and Austrian arrogance (Skëndi 1967, 226). Italian Prime Minister Francesco Crispi was Arbëreshë and he viewed the Albanian Question as pertinent on a personal and national level (Skëndi 1967, 215). Crispi envisioned an autonomous Albania with friendly relations with Italy as essential to safeguard Italian interests against Pan-Slavism and Austrian encroachment (Skëndi 1967, 215). Like Austria-Hungary, Italian policy was directed towards education, as well as increasing trade between the Albanians and Italy (Skëndi 1967, 265). Schools under Italian authority were more dispersed throughout Albania, targeting both Muslims and Christians, but usually provided instruction in Italian instead of Albanian (Skëndi 1967, 282). The Arbëreshë approach to nationalism was positioned between an organic popular nationalism and official nationalism as they too attempted to mould Albanians into an identity akin to their own. Notable patriots like Faik Konica were deeply suspicious of the Arbëreshë since “their blood had been mixed and their language corrupted” by generations of Italian rule (Skëndi 1967, 231). While the patriots appreciated the Arbëreshë's efforts to elevate Albanian culture on an international stage, many regarded their intentions in the realm of Albanian political affairs as meddling and pro-Italian.

The Albanians ultimately sided with Austria-Hungary because of their promotion of the Albanian language and ability to protect Albania against foreign invasion (Skëndi 1967, 282). The endorsement of the Latin alphabet is symbolic of Albania's allegiances shifting Westward (Vickers 2013, 60). When British diplomat Sir Robert Graves was given a tour of Albania in 1912, he observed that the “Albanians [were] claiming that their language and the Latin alphabet should be made obligatory . . . which the Greek clergy forbade” (1933, 272). He also noted how Turkish officials “were hardly pleased to find that all instruction was given in the Albanian language, and that the Austrian Emperor's portrait was very much en évidence,” illustrating the infiltration of Austrian influence in Albania (Graves 1933, 261). Yet, it is important to acknowledge that the Albanians were neither passive recipients nor apathetic to nationalism. Well before the Austrian entrance, Albanian nationalists discussed the necessity of a unified written language and better education (Vickers 2013, 44). The Austrians did not conceive of Albanian nationalism so much as provide Albanians with the tools to express and transmit it (Fischer 2014, 29).

Through the exposure of print capitalism, Albanian patriotism was transformed from a stance of cultural solidarity into expressions of political nationalism in line with Anderson's thesis. These nationalist impulses were aroused concomitantly to the physical and cultural threats of extinction

espoused by the Ottomans, Greeks, and Slavs. For this reason, it is not shocking that crowds of Albanians walked over to the Austrian and Italian consulates cheering, “Long Live Austria” and “È viva l’Albania!” on Independence Day (Tirana Times 2018). Although print capitalism was an instrument for the elites in the Albanian case, it also served to promote popular nationalism for the Albanians. As for the imperial powers, escalating tension between Austria-Hungary, Italy, and Russia over the Albanian Question had devastating consequences for the Concert of Europe in the subsequent years (Erickson and Hall 2001, 9; Skëndi 1967, 255).

Between World Orders: Creation and Demolition of the Albanian Nation-State

The Albanian nation-state came into realization at the 1913 Conference of London when Albania was recognized as an independent state in the eyes of the six Great Powers (Kropiak 2014, 55). The treaty specifically ruled out “any form of suzerainty between Turkey and Albania,” guaranteed its neutrality, and gave the International Commission the responsibility of finding a suitable German prince to become Albania’s monarch (Treaty of London 1913, as cited in Elise n.d.). The sovereignty of Albania, a tiny nation along the Adriatic, would go on to have far-reaching ramifications for the small powers of the Balkan region and the colossal empires of Europe and the Middle East at the dawn of World War I.

Despite Albania’s historical connections to the Ottoman Empire, the Albanian state resided in Europe. Imperial adaptations, instituted via official nationalism and state centralization, effectively pushed Albania Westward. Fighting against the Greeks and Turks in 1907, patriot Mihail Grameno argued that “the poor Albanians looked to the West for their salvation” because the Ottoman government “were doing everything it could to wipe out the Albanian language” and the Greeks “created a climate of terror” (Grameno 1979, as cited in Elise n.d.). Although Albania was hardly “saved” by the West, the 1913 Conference marked the dissolution of the Ottoman Empire’s territorial power in the European continent. In a vain attempt to salvage loyalty and prestige, the Empire intensified neo-Ottomanism and sided with the Germans in World War I (Sohrabi 2018, 836). The feedback loop of nationalism and war proved deadly for the Ottoman Empire, culminating in the nascent nationalist Arab Revolt of 1916-1918 and the humiliating settlements of the Lausanne Treaty (Sohrabi 2018, 837).

In the Western arena, Albanian independence solidified Russian-backed Serbian aggression and heightened suspicions between Austria-Hungary and Italy (Erickson and Hall 2001, 11; Skëndi 1967, 282). Just as Albanian nationalism was shaped by imperial rivalry, its creation also

nurtured European rivalries. A German newspaper, *Frankfurter Zeitung*, alluded to the complications the Albanian Question posed when he called on the Triple Entente to “expose the intentions of the leadership in Belgrade,” who encouraged Serbians “to exterminate the Albanians,” because Britain or France “would be less suspected of self-interest than Albania’s neighbours, Austria-Hungary and Italy” (Frankfurter Zeitung 1913, as cited in Elise n.d.). Too often, Albania goes unnoticed in accounts depicting the causes of World War I when in fact its territory was a source of immense contention for both the small Balkan powers and the Great Powers. Aside from blocking ports for Serbia and Russia which aggravated anti-Austrian sentiment in both countries, it also troubled the relationships within the Triple Alliance (Erickson and Hall 2001, 245). Although Austria-Hungary and Italy promised in initial pacts to not include Albanian territory as compensation for war gains, both powers saw the other as disingenuous (Skëndi 1967, 241). Italy’s switch to the Triple Entente was an unsurprising reverberation of this tension. Over the course of the war, Albania found itself occupied by an array of Balkan powers as well as Italy and Austria-Hungary (Dervishi 2020). The Great Powers’ original promises of sovereignty and self-determination were proven deceitful as the impulses of imperial rivalry grew stronger. After the war, with a tattered Austria-Hungary, Italy maintained jurisdiction over Albania through King Zog’s regime before establishing an outright protectorate over Albania (Vickers 2013, 140).

Independence was costly for the Albanians. Even after its post-war reappearance, over fifty percent of ethnic Albanians resided beyond the defined borders of the state (Kropiak 2014, 56). The official geography of Albania rejected the earlier propositions by Albanian nationalists (Kropiak 2014, 56). It instead reflected the political compromise between Austria-Hungary and Russia that was made to fruitlessly ensure a balance of powers (Krisafi 2014, 82). Despite the creation of a world order modelled on nation-states and self-determination after World War I, Albania’s borders established at the 1913 Conference of London remain a legacy of Great Power imperialism. The 1990s Kosovo Wars demonstrated the persistent plight of the Albanians, with the war crimes of Serbian President Slobodan Milosevic echoing the genocidal brutality of the Albanian massacres at the hands of Serbian nationalists during the Balkan Wars (Trotsky 1912, as cited in Elise n.d.).

The Albanian Question arose from the opposing forces of official nationalism and print capitalism. Foreign meddling in Albanian nationalism was indicative of the struggle between the old imperial order of empires and the new international system ordered by nation-states. Its role transcended symbolism as Albania’s territorial integrity became a catalyst for World War I. The interaction between the Albanian nationalists and the old-world empires

exemplifies the imperious role great powers assume when questions of sovereignty and territory arise, regardless of the “rules” of the international system.

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Hidden Figures: When Ransomware Cyber Attacks Jeopardize Public Health in Canada

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Introduction

From the beginning of 2020 until the first half of 2021, global ransomware cybersecurity attacks increased by 151 percent, with the healthcare sector showing to be a high-value target for cybercriminals (Cabral 2022). The Canadian Centre for Cyber Security reported 235 ransomware incidents, which included many attacks against Canadian hospital patient information systems, posing a threat to public health and hospital care operations. To address this shortcoming, one can look to Joseph Califano's "What Was Really Great About the Great Society" which discusses how U.S. President Lyndon Johnson's Great Society programs increased the federal-state involvement to enact national progressive policy (1999, 15). Using Califano's framework, this paper will argue that the Canadian federal government should be more involved in creating consistent cybersecurity laws to protect hospital patient data. First, this paper will dissect the factors that categorize public health in Canada as a public good and analyze how ransomware endangers hospital systems and patients' lives. It will then explain why Califano's argument for heavier federal government involvement serves as a framework for creating uniform policies to maintain consistent cybersecurity measures that protect hospital patients in all provinces and territories.

Public Good: Public Health in Canada

A public good is a commodity or service provided, without profit, to all members of a society by actors such as governments (Fernando 2022). In the realm of public goods, public health can be categorized as a common pool resource: a good that is "non-excludable and subtractable [rival]" (Choe and Sun-Jin 2017). The healthcare system is publicly funded through taxation, allowing all Canadian citizens and permanent residents to purchase insurance coverage for their medical needs (Immigration, Refugees and Citizenship Canada 2021). This universal accessibility contributes to the non-excludable characteristic of public health. There is a definite rivalry, however, between individuals who are searching for quality healthcare services and resources that are finite and in high public demand. The purchase of additional health insurance for more services could also instigate a rivalry (Immigration, Refugees and Citizenship Canada 2021). This paper will focus on the

governance of Canada's public health system, since healthcare networks in some provinces can experience more rivalry than others and are subject to vulnerability from cyberattacks. It will subsequently provide an analysis of the benefits and limitations of using Califano's framework in an attempt to solve these issues.

The Mechanics of Ransomware Attacks and How They Threaten Public Health as a Public Good

Over the last few years, the cybersecurity of patient data has become more of a public health concern due to a significant increase in ransomware attacks on hospitals across Canada (Hussain 2021). Hackers spread this malware by hiding it in phishing emails that contain files with a computer virus (Freeman 2021). Another common hacking method is a brute-force attack, where criminals write code that generates thousands of passwords until it iterates the correct one to gain access to a hospital computer (Ulasticadmin 2020). This overwhelms the computer system until a point of entry is made. In hospital settings, it usually only takes one infected device for an entire system to become infiltrated (Webster 2020). The ransomware encrypts files and keeps the original owners from accessing them, and hackers can program the malware to extract file types with data that they are looking to seize (Webster 2020). While the patient files are being held hostage, hackers will refrain from releasing valuable data to hospital staff until the requested ransom is paid (Freeman 2021). According to the IBM Cost of Data Breach Report 2021, the average cost for Canadian organizations was \$5.4 million in 2021, up from \$4.5 million a year before (Tuttle 2021).

Malicious attacks of this nature can cause patient care to be compromised in deadly ways. If hospital patient data is held hostage, becoming inaccessible to healthcare providers, staff will lose vital information on how to treat their patients and operations within the hospital will come to a halt (Freeman 2021). Medical and family history records can be withheld during these attacks, making it difficult for physicians and nurses to make informed decisions about patient treatment and formal diagnoses for emerging symptoms (Hussain 2021).

In the case of the catastrophic 2021 cyberattack on Newfoundland and Labrador healthcare networks, most of the province's hospitals were forced to resort to a pen-and-paper system (McKinley 2021). Thousands of Newfoundlanders had to cancel doctor's appointments and surgeries because healthcare providers lost their personal patient data, and over 2500 Social Insurance Numbers were stolen (Adriano 2021). Provincial officials ordered a new system to be from the ground up with backup derivatives of the computer code that was used to build the original digital health network. This measure

was to ensure that hackers did not leave any back doors open for re-entry once the data were returned and a ransom was paid (McKinley 2021). Reconstruction took over a month, forcing patients to endure agonizing wait times for rescheduling and costing the provincial government thousands of dollars to undergo this revitalization (Austen 2021). Additionally, their strategy of using backup system templates to restore the system only restored the data from the point of time that the system backup was made. This meant that any data updates made since then were ultimately lost (McKinley 2021). While the more primitive pen-and-paper system may have provided temporary protection from further ransomware attacks at the time, it lacked the efficiency and accessibility that digital health record systems normally provide (McKinley 2021).

How Ransomware Attacks Contribute to the Rivalry of Public Health

This threat contributes to the rivalry of public health as a public good. This is because when healthcare services are compromised and put on hold after a ransomware attack, patients are forced to find vacancies at other hospitals. A sudden influx of displaced patients can stir up competition for hospital beds and healthcare services (Dale 2022). For those in need of emergency services, it is in their best interest to find a hospital vacancy as soon as possible, as long as the new hospital can provide the specific care that they need. Hospitals are already struggling to meet the demands of public health needs due to limited capacity and finite resources, and these attacks are only making it harder for these hospitals. Additionally, the COVID-19 pandemic brought on a major decrease in occupancy amongst patients who did not have the virus, since most beds were needed for the influx of COVID-19 patients. The rate of hospital admittance for cases unrelated to the pandemic in Canada shrank to less than 11 percent from March 2020 to June 2021 as community case numbers continued to climb (Dale 2022). In fact, 50 percent of Canadians who required joint replacement or cataract surgery during the first six months of the pandemic were forced to wait longer than the recommended time frame for these procedures (Dale 2022). In cases where patients are in critical condition, this rivalry can create life-or-death situations, as individuals are in a time-sensitive scramble to find alternative care options in facilities that have limited space.

Argument and Connection to Califano

In his scholarly work, “What was Really Great About the Great Society,” Joseph Califano details the inner mechanics of the Great Society programs that were implemented by U.S. President Lyndon B. Johnson in the

1960s across the United States (1999). Califano served as Johnson's domestic advisor over the course of his presidency and aided the implementation of Johnson's War on Poverty (PBS 2022). The Great Society was a series of policy initiatives, legislation, and programs that aimed to abolish inequality (Califano 1999). He speaks highly of how these programs were ground-breaking in showing that larger state involvement could be used as "an instrument to create racial justice and eliminate poverty" (Califano 1999, 15). Califano explains that Johnson's Great Society aimed to "revolutionize the role of the federal government" (1999, 13), giving national authority a greater voice in the American economy and society at large. Califano's theoretical framework surrounding this revolution presents an argument for supporting stronger federal oversight, rather than allowing smaller state and local governments to have more control over their jurisdictions (PBS 2022). Consequently, in the minds of many Americans, the Great Society programs became a symbol of government "overreach" since some of the policies seemed too ambitious to remain stable (Piereson 2016). Despite this backlash, the Great Society and bigger state formulae were very effective in pushing for progressive regulations that could gear the entire population towards economic prosperity and safeguard public wellbeing (Califano 1999, 16).

Califano's Framework in a Contemporary Example

A contemporary application of Califano's argument for a bigger state in the context of cybersecurity and health data management is the European Union's General Data Protection Regulation (GDPR), which was adopted by the European Parliament in April of 2016 (Dewitt 2018). This piece of legislation spans all European Union (EU) member states (Nadeau 2020). The regulation harmonizes data privacy laws between all of the countries involved, creating consistent guidelines for all organizations that collect and process personal data from individuals who live in the EU member states (Nadeau 2020). For example, the GDPR outlines that all EU organizations are required to handle data securely by using "appropriate technical and organizational measures" (GDPR.EU 2019). Technical measures include anything from requiring employees to use two-factor authentication on accounts where personal data are stored, to contracting with cloud providers that use end-to-end encryption. Organizational measures can include adding a data privacy policy to an employee handbook or limiting access to personal data to only those employees who need it. If there is a cyberattack data breach, organizations have seventy-two hours to inform the data subjects or face financial and legal penalties (Nadeau 2020). It can be argued that the Canadian federal government should look to the EU as a current model that

draws on Califano's framework of stronger state involvement for enforcing consistent patient data security standards.

Canadian Legislation and Inter-Provincial Inconsistencies

Canadian institutions in all provinces and territories must abide by the federal Personal Information Protection Electronic Documents Act (PIPEDA). This federal legislation provides companies and organizations with a statutory framework to protect the personal data of those from whom they collect the information. In addition to this, the Canadian federal government implemented the Cyber Security Policy of Canada as a legal structure that aims to mitigate intrusion on the privacy of its citizens (SNCA 2022b). One must consider, however, that these laws are more general in nature, leaving room for provincial governments to design their own policies that target more nuanced topics under the information privacy umbrella, such as digitized patient records. Unfortunately, because of this gap in unified specificity, not all provinces and territories have provincial laws that pertain to healthcare information and digital health data protection. These inconsistencies across provincial borders expose data vulnerabilities, where some provinces have a more fortified plan of action compared to their neighbouring systems.

To illustrate, Nunavut and Prince Edward Island do not have their own provincial or territorial healthcare information protection laws. In these two provinces, only PIPEDA applies (SNCA 2022a). This is due to their smaller population sizes and limited government financial resources (SNCA 2022b). Predictably, Nunavut and Prince Edward Island have a record of larger ransomware attacks that create province and territory-wide health system meltdowns, whereas other Canadian regions with healthcare information-specific cyber protection laws exhibit trends of smaller attacks. To date, Quebec, British Columbia, Alberta, and Ontario have promulgated legislation that specifically focuses on information protection in the healthcare industry. This explains why there are more spikes in successful ransomware attacks in some provinces compared to others. For example, Ontario has only experienced ransomware attacks that were contained to individual hospitals, whereas Nunavut's health data systems and patient care operations have been compromised across the territory. Therefore, the federal government must step in and construct regulations that are more consistent between provinces to create a united front against ransomware attacks.

Consequences of Califano's Framework

With this in mind, it is important to consider the negative consequences that come with the federal government assuming greater

oversight for patient data policy implementation. One scenario could involve provinces resisting the stricter rules put in place by the federal government because they think that their course of action is substantial enough as is. Some provincial leaders may argue that there is not a great enough incentive to fix a digital system that is not yet broken, since it will take extra time, resources, and funding to implement these new changes.

To account for some of the limitations of having more federal involvement in creating protective patient data laws, Califano's framework can be adapted in a way that integrates provincial governments into the decision-making process. The Canadian federal government could enact one mandate that streamlines hospital compliance to reporting all cyberattacks when they occur (Caminiti 2021). This would eliminate the need for having a heavier federal presence with a multitude of new laws, and provincial governments could have more agency over patient data protection strategies for their region. The alternative framework could be supplemented with more transparent communication between private-sector cybersecurity companies and the national government. The Canadian government would collect the information it receives from the private sector and immediately share it with hospital information technology (IT) departments that might be at risk (Caminiti 2021). If federal agencies share insights on how and where hackers are targeting patient data systems in real-time, hospital IT staff can employ the necessary defensive measures to prevent a ransomware attack (Caminiti 2021).

Benefits of Federal Control

Despite the concern of provincial resistance to new national laws, Canadian federal government intervention would usher in consistently high standards for patient data protection across the country. Hospitals in Canada that do not take patient data security more seriously will have no choice but to make it a primary investment, instead of casting it aside as an operational cost (Hussain 2021). Each hospital system would be on par with the next in terms of security level, yet still have independent mechanics for system operations. This federal strategy would ensure that hackers are not able to use the same strategy to infiltrate multiple databases.

Conclusion

In summary, it is crucial that the Canadian federal government takes on a more aggressive stance to implement national cybersecurity policies that will protect public health operations and patient data across the country. As a common pool resource, public health in Canada is non-excludable, yet

rivalrous in consumption. While PIPEDA and the Cyber Security Policy of Canada are national laws that intend to strengthen the privacy and protection of Canadians' general and digital information, their impact has been limited by not including more specific and universal regulations for all provinces and territories to follow. Inconsistencies can lead to a higher likelihood and proportion of hospital systems that are unprepared for a data breach crisis. These weaker systems could fall victim to ransomware attacks more frequently, compared to those with a more concrete plan of action. Thus, to improve the governance of public health—a public good—the Canadian federal government should pursue greater consistency in standards for data security in healthcare institutions among provinces and territories. These actions would help to create a nation in which public health systems are secure and healthcare services are equally available to all, no matter which province or territory Canadians call home.

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Proportional Representation & Political Extremism

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Electoral systems are foundational elements of electoral democracies that can be mechanistically altered to achieve particular objectives. The way in which votes in elections are translated into seats in legislatures is integral to the quality of political representation and, by extension, to policy outcomes. In this paper, I will broadly distinguish between majoritarian and proportional electoral formulae, comparing their respective effects on political extremism. Majoritarian electoral systems, including Canada's "first past the post," allocate seats to representatives in local constituencies based on one candidate gaining a plurality of the vote (Carter 2002, 133). Majoritarian formulae, through disproportional representation, systemically favour generally larger "big tent" parties and promote the construction of parliamentary majorities (Carter 2002, 133). In contrast, proportional electoral systems distribute seats in some proportion to the popular vote for candidates or parties in districts of generally greater magnitude (Carter 2002, 133). Proportional representation (PR) often results in party system fragmentation and representation of a greater ideological range, favouring broad multiparty coalition governments (Jensen and Lee 2018, 3). Most PR systems, such as Mixed Member Proportional (MMP), are characterized by a mixture of majoritarian and proportional attributes (Jensen and Lee 2018, 1–2).

Ideally, in order to accurately pursue the interests of citizens, a representative parliament should accurately reflect the popular vote. However, proponents of majoritarian electoral systems often argue that PR encourages political extremism. The prospect of extremist representation in parliaments, the accompanying leverage in coalition governments, and the ensuing impact on policy are enough to end many debates on electoral reform. In a 2018 interview, Prime Minister Justin Trudeau argued PR would "exacerbate small differences in the electorate" and be an overall harm to Canadians (Von Scheel 2018). Critics point to far-right governments elected in Poland and Hungary under PR systems, as well as instability in some proportionally represented democracies as evidence of the detrimental effects electoral reform could have. Ferdinand A. Hermens, an early critic of PR, claimed that the rise of the Nazi government in 1930s Germany was directly attributable to Germany's PR electoral system at the time (Carter 2004, 82). Conversely, proponents of PR point to successful PR democracies in Western Europe and rising polarization in the USA, Canada, and the United Kingdom as arguments for PR as a means of democratic reform. In this paper, I will counter the narrative

against PR with a survey of empirical studies which examine the effect of PR on political extremism. I will argue that majoritarian electoral systems lead to political polarization and exacerbate political extremism and that, conversely, proportional representation reduces extremist influence on policy while ensuring proportionate representation of a wide range of ideological perspectives and, ultimately, a healthier and more stable democracy.

Majoritarian electoral systems mechanistically provide larger parties with greater and disproportionate representation in legislatures (Carter 2002, 133). It is held that majoritarian electoral systems discourage voters from voting for small parties because they stand little chance of gaining representation (Arzheimer and Carter 2006, 423). By this logic, (often small) extremist parties are unlikely to gain proportionate representation under majoritarian electoral systems. Indeed, a 2004 study by Pippa Norris finds that radical right-wing parties tend to gain higher seat counts under PR and mixed electoral systems (2004, 228). It is therefore argued that proportionate representation in legislatures should necessarily translate into higher vote shares for extremist parties. While Norris finds that majoritarian electoral systems fail to suppress the vote share of extremist parties, it is nevertheless argued that majoritarian systems limit extremist access to legislative office and thereby to legitimacy and power over policy (2004, 228). While the democratic merits of such a result should be debated, I will examine whether the correlation between proportional representation and the vote share of extremist parties does, in fact, exist.

A study examining 33 Western European right-wing extremist parties over a 23-year period concludes that characteristics of PR systems, including high district magnitudes, low effective thresholds for representation, and high overall proportionality of seat apportionment, do not translate into significantly increased vote shares for parties of the extreme right (Carter 2002, 132). The study's author notes that while extremist parties performed well under proportional formulae in Austria, Italy, and Norway, they were also enormously successful under majoritarian formulae employed in France (Carter 2002, 134). Equally, as expected, far-right parties performed poorly in the UK under a majoritarian system, yet equally badly in Germany, Portugal, and Spain, which are countries that use PR electoral systems (Carter 2004, 89–90). Therefore, empirical evidence suggests that the share of the popular vote garnered by extremist parties is unrelated to the electoral system in which they compete. Notably, however, the study is limited to far-right parties, meaning different dynamics may appear among moderate or leftist voters (Carter 2002, 138). Many other factors, including anti-immigrant sentiment, austerity policies, and growing inequality, are suggested as being of greater relevance when examining the rise of extremist far-right movements (Klein and Saran 2016). Therefore, I think given the empirical evidence, the rise of

Hitler in Germany or modern far-right movements in today's Europe, which happen to have occurred in countries utilizing PR, can be attributed to economic and social circumstances rather than electoral policies (Klein and Saran 2016).

Nevertheless, it is undeniable that PR systems lead to a larger number of parties expressing a wider range of political views. The studies I have thus far engaged with examine the vote shares of extremist parties. However, if the representational benefits of PR systems for extremist parties cannot be said to increase said parties' vote shares, it is arguable that their presence in legislatures influences the overall political landscape. A 2011 study, examining 31 electoral democracies based on electoral systems' proportionality, finds that proportional systems support greater ideological dispersion whereas less proportional systems incentivize parties to converge to the centre of the electoral space (defined by the median voter in each country) (Dow 2011, 341–345). This effect is described as either centrifugal or centripetal (Jensen and Lee 2018, 1). Centrifugal effects describe party fragmentation and political polarization, while centripetal effects represent moderation and party adhesion characteristics of majoritarian systems (Jensen and Lee 2018, 1).

Given the coalitional nature of governments formed in multiparty systems, it is often claimed that extremist parties can gain actual legislative power without the express consent of even a plurality of voters (Jensen and Lee 2018, 3). Arguably, because large parties competing in often two-party majoritarian elections can be seen as broad coalitions, majoritarian systems allow voters to clearly select the “coalition” they want to govern (Policy Options 2004). Conversely, under PR systems, parties can negotiate alliances after electoral results and make compromises on policy goals at a distance from voters (Policy Options 2004). In response to this argument, I contend that while coalitional governments may appear in that sense to be less democratic, vote choices between only two viable parties arguably lead voters to vote strategically between the lesser of two evils and, therefore, to compromise their views in a more forceful way than if they vote for a party which collaborates with a rival party in government. Equally, because parties must eventually face voters after coalition talks, it would be unlikely for a moderate party to choose an extremist partner since their voters could easily swing to another moderate party in a multiparty system. If anything, multiple moderate parties can stem plurality wins by far-right parties. A multiparty system, via the existence of many smaller parties, also allows moderate parties to cooperate to form government. This is arguably because they have less to lose electorally from cooperating with each other than with far-right parties.

Another important debate is whether the viability of extremist parties in the public discourse necessarily legitimizes their ideas or shifts other parties

in more extreme directions. Arguably, extreme parties could dramatically shift the Overton window of acceptable policy if given proportionate representation. Arzheimer and Carter expect that the position of mainstream right-wing parties can be intricately linked with that of their extreme right-wing counterparts (Arzheimer and Carter 2006, 423). They propose that a more right-wing mainstream party could either hurt extreme right parties or equally help them by legitimizing the policies around which far-right activists mobilize (Arzheimer and Carter 2006, 424). While such political dynamics may occur in PR countries, they nevertheless characterize majoritarian political systems as well. By their nature, majoritarian systems tend to favour two “big-tent” parties which vie for voters in the centre of the political spectrum. However, in order to maintain their electoral viability, big-tent parties must prevent the formation of more extreme parties. In doing so, they can be pressed to adopt much more extreme policies than their voters in the centre would support independently. A notable Canadian example is Prime Minister Stephen Harper’s pledge to create a “barbaric cultural practices hotline,” widely seen as pandering to islamophobia among the far right, yet nevertheless electorally favourable for the Conservative party (Barber 2015). More recently, many prominent opposition Conservative MPs showed overt support for “Freedom Convoy” protestors, despite public opinion polling showing that two-thirds of Canadians supported legislation to end their illegal blockades (Nardi 2022). Unlike in multiparty systems, voters in the centre can reasonably be persuaded to vote to their right or left in favour of a lesser evil. In this way, it is instead majoritarian electoral systems which are more likely to lead to far-right ideologies having sway over legislation. Indeed, a 2008 paper by Lawrence Ezrow found no evidence that average party policy extremism increases under PR or in multiparty systems in general (2008, 479). In fact, the study finds that multiparty systems contribute to greater policy moderation (Ezrow 2008, 480).

From the perspective of majoritarian systems, political polarization can be better explained. Noting that the U.S. Congress is more polarized than at any time since the civil war (Hare and Poole 2014, 415), Hare and Poole claim that the adoption of non-proportional representation constrained the electoral system to one of two parties (Hare and Poole 2014, 414), effectively forcing once separate, regional, racial, and cultural issues into the left-right divide between Democrats and Republicans (Hare and Poole 2014, 416). While partisanship is arguably healthy for a democracy, the type of polarization exhibited in the United States, where there is evidence that Republicans and Democrats have begun geographically sorting between red and blue states respectively (Hare and Poole 2014, 421), can only be worrying for democracy and the public good. I acknowledge that under PR, extremists may be more likely to form electorally viable parties. However, their policy

proposals can be freely assessed through public discourse, rather than inexorably advanced under the undemocratic dynamics imposed by a two-party system. I believe it is important, given the evidence that extremist views do not flourish under PR, to assess the benefits of proportional representation for the democratic process. One of the four key principles of representative government identified in 1997 by Bernard Manin is the concept that public decisions must undergo the trial of debate (Manin 1997, 6). For representation to be truly democratic, it is imperative that electoral laws are as neutral as possible. I contend that this debate must, as intended, occur in parliaments instead of being restricted by disproportionate representation under majoritarian electoral systems.

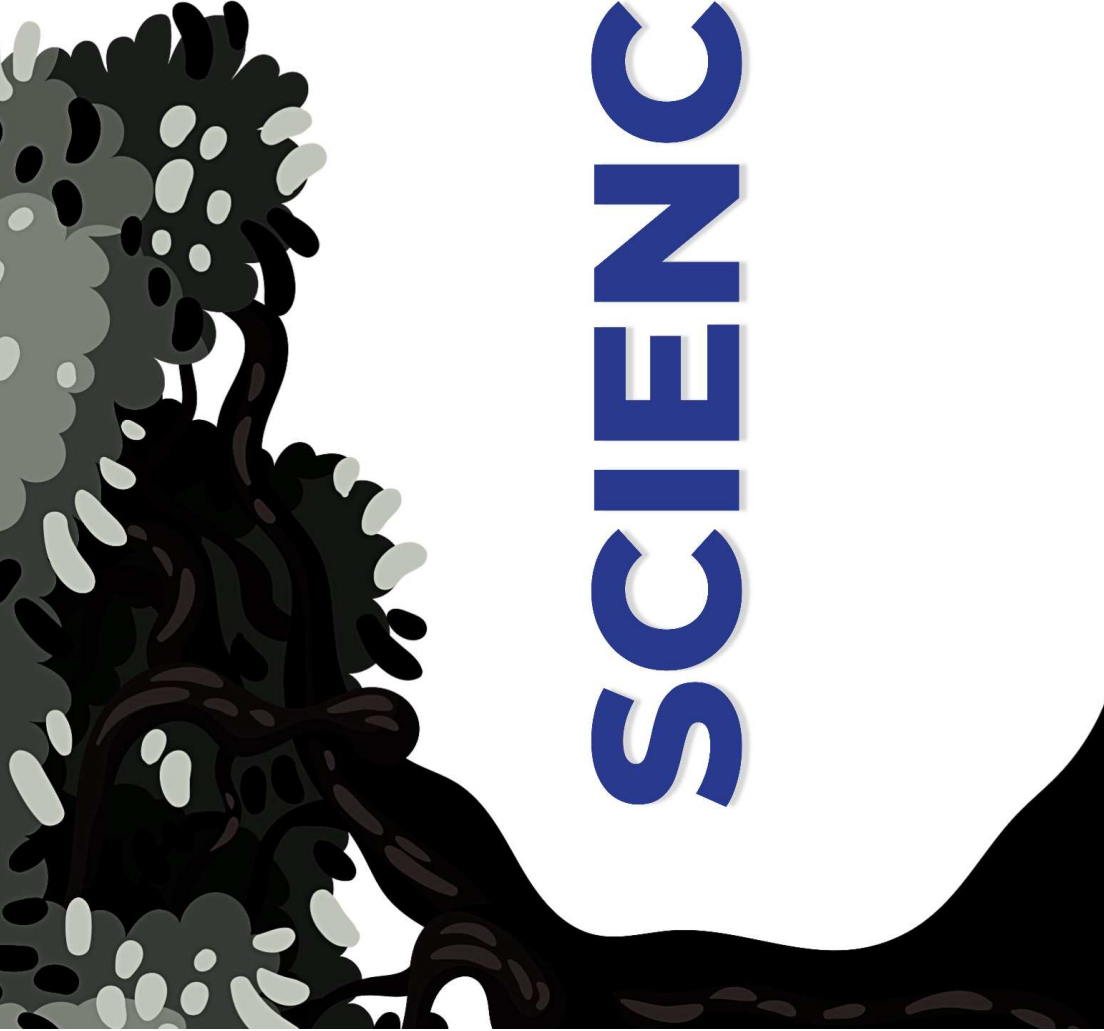
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SCIENCES



A Case Study: Tripartite Influences on Physiology, Sleep, and Behaviours in Children with Autism Spectrum Disorder

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Abstract

Past studies have found that children with autism spectrum disorder (ASD) are more vulnerable to experience problems in their sleep than neurotypical children. Furthermore, sleep disruptions and problems worsened and amplified behavioural problems in children with ASD, such as rule-breaking or aggressive behaviours. The current case study will focus on a particular article by Hillary K. Schiltz, and colleagues entitled "Electrodermal Activity Moderates Sleep-Behaviour Associations in Children with Autism Spectrum Disorder" (2022). The study builds upon previous studies and examines the interaction between the effects of the sympathetic nervous system and sensitivity to the effects of poor sleep on daytime behaviours. Electrodermal activity (EDA) was used to examine the sympathetic nervous system, using methods measuring for average skin conductance skin level (SCL) and conductance level reactivity (SCL-R). Results showed that low SCL positively moderates the relationship between sleep and behaviour, specifically that children display greater daytime behavioural problems when sleep disruptions are high. In terms of SCL-R, higher reactivity levels were related to greater situational non-compliance with high sleep problems. Sleep was also shown to be a significant predictor of daytime behaviours, such that a restful night with low sleep disruptions led to lower non-compliance regardless of SCL-R levels. The current case study aims to provide a new understanding of autism spectrum disorder and help break down the stigma surrounding ASD. The results especially focus more on the individual, not their diagnosis, as their behaviours are amplified by sleep disruptions and physiological patterns, not the disorder. The study also provides future advances to specialize treatments for individuals with different EDA levels, which contributes to sleep sensitivity to daytime behaviours.

Quality of Sleep and Behaviours in Children with ASD

Autism Spectrum Disorder (ASD) is categorized by impairments in social communication and interaction and by displays of repetitive behaviours, interests, or activities (American Psychiatric Association, 2013). In 2009, Richdale and Schreck published a study that explored sleep disorders in children with ASD. This study found that children with ASD are more

vulnerable to sleep problems compared to children without ASD, with parental reports of sleep problems ranging from 50-80% in children with ASD. Focusing on the effects of sleep disruptions in people with ASD, it is found that sleep problems worsen and amplify external behavioural problems (Cohen et al., 2014). These two studies highlight a potential cause of problematic daytime behavioural issues correlated with poor sleep quality.

Physiology Changes in EDA on Sleep and Behaviours

El-Sheikh and Arsiwalla (2010) examined the specific association between sleep and behaviours through psychophysiological functions in children with neurotypical development. They found an interaction between the sympathetic nervous system and sensitivity to the effects of poor sleep on daytime behaviours. Electrodermal activity (EDA), which detects the electrical currents through the skin, was used to examine the sympathetic nervous system. Two methods of measuring EDA are average skin conductance level (SCL) and skin conductance level reactivity (SCL-R). SCL communicates a resting baseline EDA that reflects the overall autonomic arousal changes. SCL-R is another way of assessing EDA as it communicates the changes in autonomic arousal in response to stress or other stimuli. This study revealed that children with neurotypical development with either a low SCL or high SCL-R would be more sensitive to their quality of sleep, which negatively correlates with their behavioural functions (El-Sheikh & Arsiwalla, 2010). Thus, varying physiological factors, such as stress, may be responsible for the relationship between sleep and behavioural functions. Prior studies have established a strong connection between sleep disturbances and daytime behaviours in children with ASD (Cohen et al., 2014; Mazurek & Sohl, 2016). Psychophysiological functions have also been shown to indicate the effects of sleep on behaviours in neurotypical developing children (El-Sheikh, Arsiwalla, 2010).

Examination of the Interactions between Physiology, Sleep, and Behaviours

Investigations on the relationship between sleep and Behaviour in ASD reveal that physiological changes through EDA measures were found to be significant in predicting sleep-behaviour patterns for children with ASD. This case study will focus on a particular article by Hillary K. Schiltz, and colleagues entitled "Electrodermal Activity Moderates Sleep-Behaviour Associations in Children with Autism Spectrum Disorder" (2022), which combines and builds upon previous studies by examining the physiology of

sleep-behaviour interaction in children with ASD and the effects of their interaction in predicting daytime behaviours. In this study, children between the ages of 6 to 10 and their primary caregivers were selected based on the criteria of having an ASD diagnosis confirmed by study-administered assessments (Schiltz et al., 2022). The sample selected featured participants from diverse racial/ethnic backgrounds, socioeconomic status, IQ range, and marital status of primary caregivers. The measures for this study included direct child testing, electrodermal activity data collection, and collection of data with caregivers. The study utilized the same methods as the El-Sheikh and Arsiwalla (2010) study in measuring EDA data to demonstrate physiological changes. EDA data was collected by placing two Ag-AgCl electrodes onto the palm of the child's non-dominant hand. The baseline SCL was measured by placing the child in front of a television that displayed non-arousing pictures of nature. After collecting baseline SCL, researchers measured SCL-R by having the child participate in a challenging task that elicits physiological arousal (Schiltz et al., 2022). Parents also identified sleep problems and behavioural problems such as broad externalizing symptoms and non-compliance behaviours. These include parents' ratings of rule-breaking and aggressive behaviour of the child in the past six months (Schiltz et al., 2022).

Results

Average SCL Rates in Sensitizing Children to Sleep and Behaviour

The study's first aim was to identify an association between EDA, sleep problems, and behavioural problems. The results showed that sleep problems are intricately connected to minor situational behaviour problems, such as predicting situational non-compliance and long-term clinically oriented behavioural patterns like broad externalizing symptoms (Schiltz et al., 2022). The caregivers indicated situational non-compliance based on whether the child had problems following instructions or transitioning between various situations (Schiltz et al., 2022). Simple effects analysis showed that with a low resting average SCL, the effects of sleep problems on situational non-compliance are positive and significant. This means that low SCL baseline rates are associated with lower situational non-compliance when sleep problems are low and high situational non-compliance when sleep problems are high (Schiltz et al., 2022).

Similar to situational non-compliance, the results also showed a positive and significant correlation between sleep problems and externalizing symptoms on low levels of SCL baseline rates. However, in the context of

high SCL baseline rates, the effects of sleep problems on externalizing behaviours were not significant (Schiltz et al., 2022). The results showed that children with lower baseline SCL were more sensitive to the effects of both better and worse sleep across all behaviours (Schiltz et al., 2022). This means that for children with a low baseline SCL, any disruptions to their sleep can influence their daytime behaviours, for better or worse. This finding is especially important as it brings to light the vulnerability of children with low SCL rates as they are more sensitive than other children with ASD to sleep-behaviour problems. This could lead to the development of new prevention strategies and treatment methods as parents could provide additional support for children with lower SCL, potentially increasing the quality of sleep and limiting problematic behaviours.

Importance of Quality of Sleep in SCL-R Rates and Behaviours

In terms of reactivity of skin conductance level (SCL-R), simple effects analysis showed the effect of sleep problems on situational non-compliance was positive and significant with a high SCL-R but was not significant with a low SCL-R. This means that greater EDA reactivity (high SCL-R) was related to greater situational non-compliance with high sleep problems. On the other hand, when children have a restful night with low sleep problems, situational non-compliance is low regardless of SCL-R levels (Schiltz et al., 2022). Sleep problems in context with high SCL-R are a factor in situational non-compliance but not significant in externalizing behaviours. These results turn the issue of problematic displays of externalizing behaviours to high sleep disturbances, where sleep problems are the primary factor and SCL-R level is the additional component in daytime behaviours.

Implications and Significance

This study has built upon previous studies regarding the importance of sleep for children with ASD, as it serves as a major contributor to their daytime behaviours and symptoms. This study was also the first to highlight the interactions between sleep, behaviour, and physiological factors in children with ASD. Emphasizing the importance of decent quality sleep for children, especially those with lower baseline EDA, as they are the most vulnerable to externalizing problems and situational non-compliance. An important strength to highlight for this study is the diversity of the sample, which includes children from different IQ ranges, racial backgrounds, and socioeconomic statuses, which allows inclusivity and a broad range of

applications to most, if not all, families. This study and all previous studies provide a new understanding of autism spectrum disorder and specifically help break down the stigma surrounding ASD. In the broader sense, this study explains the awkward, aggressive, and other behaviours due to the combination between sleep disturbances and physiological factors, not from the person themselves. This breaks down certain negative thoughts or feelings about people with ASD as it focuses more on the person, not their diagnosis: their behaviours are not because of autism but because they are amplified due to problems in sleep and physiological patterns.

This study has the potential implications for influencing personalized interventions for children with ASD as it identifies how physiological differences, such as various levels of EDA in combination with sleep quality, can sensitize children in their daytime activities. A recent study conducted by Hunter and colleagues (2020) focused on the effects of sleep interventions in children with ASD. The study found that all treatment studies showed positive effects of sleep intervention strategies, and some found changes in stereotypical behaviours and daytime externalizing symptoms (Hunter et al., 2020). These results bring attention to the importance of identifying the associations between physiology, sleep problems, and their resulting behaviours. This allows specific sleep intervention strategies that can be customizable for each child. For example, different sleep intervention strategies can be used according to the child's EDA levels, which contributes to poor sleep sensitivity to externalizing actions. Therefore, this study provides a basis for potential future advances in specializing treatments for individuals with ASD, showing promising results in improving challenging daytime behaviours.

To conclude, the study conducted by Schiltz, and colleagues (2022) helped to destigmatize ASD as it focuses the problematic behaviours on challenging external influences rather than the diagnosis. This study also brought forth advances in exploring physiological factors and sleep as contributors to behaviours in children with ASD, which introduces future studies to the possibilities of exploring other physiological possibilities concerning behaviours and sleep and allows specialized sleep interventions for children with ASD to improve their daytime behaviours.

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Effects of External Motivation on Desire Understanding in Autism Spectrum Disorder

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Abstract

Theory of mind – the fundamental cognitive capacity to perceive other people’s mental states – is impaired in autism spectrum disorder (ASD). External motivation is shown to improve the performance of children with ASD in false-belief tasks. The current study examines the effect of external motivation on desire understanding, particularly children’s ability to predict people’s behaviour based on the recognition that people can hold different preferences. Typically developing (TD) children (n=6, Mage = 5 years) and children with ASD (n=7, Mage = 5 years) were presented with a preference of character that either aligns with (Similar Task) or contradicts (Dissimilar Task) their own preference. By asking children to predict the behaviour of the character, we assessed children’s desire understanding. Results indicated that children did not differ in their performance in the Similar Task. While TD children outperformed children with ASD in the Dissimilar Task, this difference was eliminated when children with ASD were offered a reward. These results challenge dominant theories of deficient ToM in ASD and highlight the potentiality of external motivation in improving the cognitive functioning of children with ASD.

Keywords: Theory of Mind, desire understanding, autism spectrum disorder

Theory of Mind (ToM) – the ability to conceive other people’s mental states – is a predictor of many fundamental cognitive capacities in young children, such as social adeptness, success in school, and peer acceptance (Baron-Cohen et al., 1985; Carlson et al., 2013). Extensive research demonstrated impaired ToM in children with autism spectrum disorder (ASD), including reduced performance on simple false-belief tasks (Begeer et al., 2003; Peterson et al., 2013). It has been proposed that children with ASD either lack ToM entirely or require external motivation to activate it (Broekhof et al., 2015). Desire understanding is a stage of ToM development that describes the ability to predict people’s behaviour based on the recognition that people can hold different desires (Baron-Cohen et al., 1985; Phillips et al., 1995). Given that motivations are closely linked to one’s desires and behaviours, examining the effects of external motivation on desire understanding in ASD offers important insight into the operating mechanism of ToM in the disorder.

Typically developing (TD) children acquire mental concepts of ToM in different stages. Their ability to recognize beliefs and intentions emerges first, proceeded by an understanding of desires around the age of five (Hiatt & Traflet, 2010; Rieffe et al., 2001; Wellman & Liu, 2004). Desire understanding particularly allows the prediction of people's behaviours according to their preference, even when it contradicts the observer's own desire (Rieffe et al., 2001)

Social motivation theory proposes developmental anomalies in ASD, including impaired ToM, to be a result of diminished motivation to engage in social behaviours (Bottini, 2018; Chevallier et al., 2012). Although external motivation is shown to improve the social and academic functioning of children with ASD, its effects on ToM tasks have yielded ambiguous results (L. K. Koegel et al., 2010; R. L. Koegel & Frea, 1993). Begeer et al. (2003) found no improvements in ASD children (mean age = 9 years) when they were rewarded in false-belief tasks, whereas ASD participants (mean age = 10 years) in a study by Peterson et al. (2013) demonstrated better ToM in a similar procedure. The non-significant findings might be due to experimental designs that demand more attention and working memory, functionings also impaired in ASD (Berger & Ingersoll, 2014; Wang et al., 2017). The effects of external motivation, therefore, are likely maximized in tasks with a simple design.

This study aims to extend the current findings on the effects of external motivation on ToM by examining ASD children's desire understanding in response to a reward. I hypothesize ASD children display an impaired desire understanding only when the actor's desire contradicts their own. When offered a reward, desire understanding of ASD children improves but is still poorer than that of TD children given the intrinsic ToM impairment in ASD.

Methods

Participants

Thirteen 5-year-old pre-schoolers (12 female) participated in the study. The sample consisted of 7 ASD children and 6 TD children. Children were randomly assigned to one of the two reward conditions and participated in both similar and dissimilar tasks.

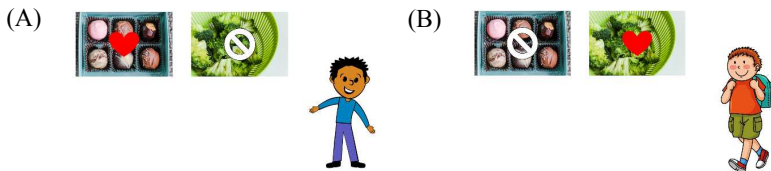
Materials and Procedure

The task in this study is adapted from the "Desire Task" by Ketelaar et al. (2012). In the task, children were asked to participate in a game where they had to answer some questions. Participants were assigned randomly to either the reward or no reward conditions; those in the reward condition were told

that they would be rewarded for answering the questions correctly, while others completed the task without being informed of any rewards (Begeer et al., 2003). During the task, children were first shown a picture of a more and a less desirable food (i.e., chocolate and broccoli) and were asked which food they preferred to eat. Children preferring the less desirable food were excluded (1 TD). A character was then introduced – in the similar task, the character’s preference coincided with the child’s preference; in the dissimilar task, the character’s preference conflicted with the child’s preference. A test question: “Which food will the character pick?” and two attention-check questions: “Does the character like chocolate?” and “Does the character like broccoli?” were asked. Children earned one point per trial if all questions were answered correctly and were given 0 points if they failed to answer any of the questions. Total scores from four trials – two similar tasks and two dissimilar tasks – were calculated to determine performance in desire understanding.

Figure 1

Design for Desire task. (A) Example of Similar Task. (B) Example of Dissimilar Task.

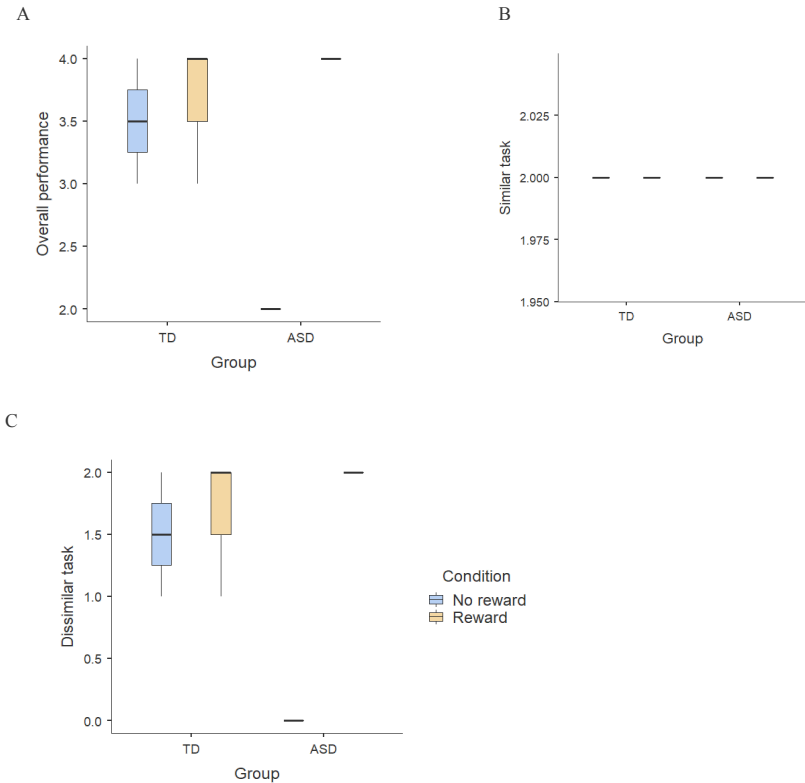


Results

Children’s desire understanding was assessed using a 2 (Group: ASD, TD) x 2 (Condition: Reward, No Reward) ANOVA. Analysis for the overall performance showed main effects for Group, $F(1, 10) = 6.59, p = .033, \eta_p^2 = .45$, and Condition, $F(1, 10) = 22.72, p = .001, \eta_p^2 = .74$, which was qualified by a Group x Condition interaction, $F(1, 10) = 16.27, p = .004, \eta_p^2 = .67$ (Figure 2A). All children had comparable performance in the similar task (Figure 2B). The same main effects and interaction of Group and Condition were found in the overall performance and dissimilar task (Figure 2C), hence differences in the overall performance were accounted for by participants’ performance in the dissimilar task. More specifically, TD children outperformed ASD children in the dissimilar task when there was no reward, and this difference was eliminated when a reward was offered.

Figure 2

Performance as a function of Group and Condition



Discussion

As expected, ASD children successfully predicted the behaviours of people with the same preference as them, regardless of the presence of an external motivation. TD children outperformed AD children in understanding contradicting desires only when no reward was offered. The outcomes are in agreement with the tendency of children with ASD to attribute their own preferences to others by assuming people share the same desires (Baron-Cohen et al., 1985). In line with studies that support the effectiveness of external motivation in facilitating ToM, ASD children in the reward

condition showed improved desire understanding compared to those in the no reward condition (Peterson et al., 2013). This outcome confirms the difficulty in ToM ASD children experience might be due to the motivationally barren features of conventional false belief tests (Peterson et al., 2013). Consistent with the social motivation theory, external reward likely encouraged ASD children to utilize their existing ToM abilities (Broekhof et al., 2015; Chevallier et al., 2012).

Contrary to predictions however, the performance of ASD children improved to a level comparable to that of TD children when a reward was provided. This outcome suggests an intact ToM in ASD children such that the observed deficits are a result of external factors, instead of a impaired ToM as suggested by the dominant theory (Baron-Cohen, 1991). Other than its theoretical implications, the finding of the current study suggest promising benefits of adapting rewards and interest facilitation into ASD intervention programs.

The validity of the current study was limited in several ways. First, the small sample size restricted the generalizability of the findings. Second, the experimenter conducting the Desire Task was aware of the study purpose and hypothesis, hence the performance of participants was potentially influenced by the experimenter's expectations. Third, other factors shown to affect ToM in children with ASD were not measured, such as gender, executive functioning, and language competence (Durrleman & Franck, 2015; Hill, 2004; Lai et al., 2015). Future studies on the same effects should attempt to test a larger sample and look at other potential factors.

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Drought-Induced Stress Responses of Reference and Mutant *Arabidopsis thaliana* Strains

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Abstract

The stationary nature of plants has driven evolution in plant mechanisms that better allow for their fitness to be maintained. Many plants in non-tropical habitats face death from drought threats and alter their physiological conditions accordingly in response to such stimuli. One reference and two mutant strains of *Arabidopsis thaliana* were followed closely in their growth cycles with their height and aboveground fresh weight measured after a period of 6 weeks. The investigation sought the impact of water stress on the plant's growth and development in both a negative control group with regular watering, and an experimental group that was withheld from water for each strain. By maintaining a control and an experimental group for each strain, comparisons between drought-affected and regularly watered plants can be observed upon analysis of recorded metrics. Drought stress was found to decrease growth in the reference strain, but the mutant strains' inability to either produce or respond to abscisic acid (which limits growth by inhibiting cell division and elongation) created growth trends similar to their controls.

Keywords: *Arabidopsis*, abscisic acid, growth

Introduction

A distinguishing characteristic of plants is that they are unable to exhibit any form of locomotion. Consequently, their fate is often determined by external factors present in their environment. To counteract this dilemma, plants have evolved mechanisms that over millions of years, have allowed them to thrive and maintain fitness in diverse ranges of habitats. Accumulated differences in DNA base pairs underlie the molecular basis of change; they may eventually give rise to phenotypic differences within a species that give a particular individual an edge to populate the next generation in a given environment and climate (Keir et al., 2022). In this investigation, we focus our attention on plants' responses to environmental stimuli which in this case is drought or water stress.

Drought is an increasingly common source of environmental stress for

plants in many areas across the globe as a result of climate change, with a seemingly obvious toll on plant growth and development. Plants have adapted some mechanisms to overcome this hurdle that limits their development. In general, water stress may change metabolic rates by altering cellular concentrations of macronutrients, micronutrients, and antioxidants to affect cell structure which indirectly affects growth capabilities (Sconiers et al., 2020). Examples of such cellular modifications witnessed in plants include strengthened leaves & cuticles, and additional trichomes & chemicals produced (Sconiers et al., 2020). For the purposes of this study, focus will primarily be on *Arabidopsis thaliana*.

Arabidopsis thaliana of the Brassicaceae family is the species of interest in this investigation. Its readily sequenced genome and fast growth cycle make it a desirable species to study responses to environmental stimuli. Three specific strains (one reference, two mutants) of *Arabidopsis* have been selected. The Ler-0 reference strain constitutes a mutation in the ERECTA gene via x-ray treatment which allows it to grow more upright (Keir et al., 2022). The mutant strain aba1-1 is the Ler-0 strain treated with the chemical ethyl methanesulfonate (EMS) causing a genetic mutation that inhibits the production of the stress hormone abscisic acid (ABA). The abi1-1 mutant strain is similarly synthesized from exposing Ler-0 to EMS that instead results in inhibition of its ability to respond to produced ABA. It should be noted that ABA plays a crucial role in the response to plant stress by regulating the growth of primary roots and shoots due to its inhibitory nature (Sun et al., 2018).

Of interest is the effect of drought stress on growth based on physically measurable metrics. In this case, dependent variables were shoot height as measured with a ruler, and aboveground fresh weight as measured with a scale. The independent variable was the plant's watering patterns (either regular or abstained watering). Constants in the experiment that potentially contribute to growth were light and temperature. For this experiment, a negative control group is defined with regular watering patterns whereas the experimental group receives intermittent periods of abstained watering to simulate drought. For each of the 3 strains, there will be a negative control and an experimental drought-treated group. The null hypothesis was that abstained watering patterns have no effect on the height nor weight of *Arabidopsis*. In theory, if the lack of a consistent water source limits a plant's development due to ABA production which limits primary growth, there should be a general decrease in the mean height and weight of the experimental Ler-0 group compared to its control. Additionally, roughly equal height and weight should be seen in aba1-1 drought-exposed samples

compared to its control due to lack of ABA production. Similarly, experimental *abi1-1* with inhibited response to ABA should see similar or slightly decreased height and weights in comparison to its control because of the little possibility of responding to ABA.

Materials and Methods

During the first week, seeds of Ler-0, *aba 1-1*, and *abi 1-1* strains were stored in 1.5ml microcentrifuge tubes. Six tubes were separated and labeled according to their respective strains, ensuring that there was a control group and experimental group for each of the 3 strains. Seeds were sterilized in their tube by addition of 0.5mL of 30% bleach solution for 3 minutes, shaking each minute. After the seeds settled, bleach was pipetted out via P-1000 micropipette and disposed of accordingly. Seeds were then rinsed with 200 μ L of distilled water which is subsequently pipetted out after settling. This sequence was repeated 2 more times to ensure complete sterilization (Keir et al., 2022).

With a new pipette tip, 100 μ L of cooled 0.1% agarose was added to the tube, pipetting the solution and seeds repeatedly to mix. Subsequently, the seed-containing agarose solution was dotted onto an MS agar plate, which was wrapped in aluminum foil to inhibit light and stored in a cool (\sim 4°C) environment for 3 days to improve germination odds. Plates were then moved to the growth chamber of constant 22°C, average relative humidity of 60%, & receiving 16 hours of daylight. During the second week, plants were allowed to grow and were watered by spraying water in the air and on lids with a spray bottle if droplets were not already present on lids.

In week three, 18 pots were each prepared with dampened soil and 0.17g slow-release osmocote fertilizer, making sure gloves were used in the handling. For each strain and control/experimental group combination, there were 3 pots to increase sample size. With tweezers, 9 seeds were allocated to each pot, evenly spread out along the perimeter with one in the center. Seeds were then sprayed and covered with plastic wrap. Beyond this point, plants were watered periodically by soaking pots in a tray with half-inch depth of water for 15-30 minutes at a time, and plastic wrap was removed after 3 days. To insinuate drought stress during weeks four-six, experimental treatment pots were abstained from watering unless wilting symptoms were displayed, while regular watering patterns were maintained for negative control groups in order to make comparisons between groups. After week six, dependent variables were recorded. Plant height was measured using a ruler from the bottom of the shoot to the shoot apical meristem, and the plant was

subsequently cut for weight measurements by utilizing weigh boats and scales.

In order to perform meaningful analyses and determine correlations within the extracted data, GraphPad software was deployed for t-tests, which are convenient calculations of parameters essential for significance determination between 2 groups. By inputting and comparing measurements between strains and control/treatment groups, GraphPad efficiently calculated actual p-values, calculated t-values, means, standard deviations and subsequently variance, and standard error. Via t-value and p-value comparisons to their respective cutoffs, it can be determined whether to reject null hypotheses. Lastly, Microsoft Excel spreadsheet software was employed to provide visual representations that show some correlations in a more obvious way.

Results

After plotting mean heights of *Arabidopsis* across all strains and treatment/control groups, it can be visually observed in **Figure 1** that the difference between the mean height of drought-treated and negative control Ler-0 is greater in magnitude when compared to those differences within the other two strains. A side-by-side picture of the Ler-0 groups confirms this finding. Further detail to note is the consistency across standard deviation error bars thus low standard deviations, noting the plant's general consistency in height growth.

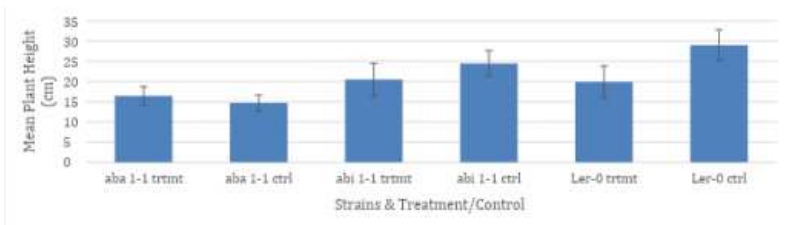


Figure 1: Mean heights of *Arabidopsis thaliana* strains under drought treatment or negative control conditions as measured with a ruler. Standard deviation error bars are depicted.

In **Figure 2** which plots each strain & control/treatment against weight, the most evident observation is the drastic relative decrease in the mean treated Ler-0 weight compared to the negative control. Though, the general trends in

comparisons between the control and the drought-treated group within each strain are identical. At first glance, an astonishing detail is the high variability in recorded weights of the Ler-0 control group as portrayed by the great length between the upper and lower bounds of the standard deviation bar. This indicates high standard deviations. Upon closer inspection, every group in fact possesses error bars with its lower limit situated at half of its value, denoting its magnitude. This indicates inconsistent plant weight on an individual basis in contrast to the consistency of plant height.

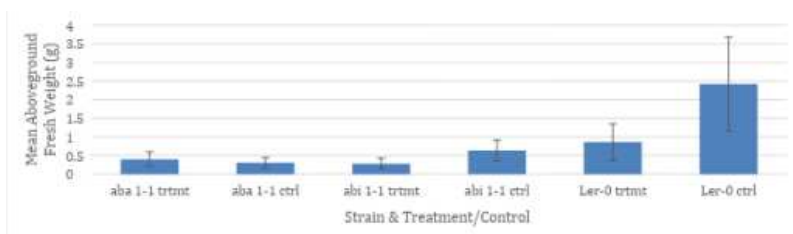


Figure 2: Mean aboveground fresh weight of *Arabidopsis thaliana* strains under drought treatment or negative control conditions as measured with weighing boat & scale. Standard deviation error bars are depicted.

Information in **Table 1** and **Table 2** result from t-tests for significance analysis by comparing plant height & weight data between the experimental and control groups within a strain. Additionally, comparisons were made between the experimental groups of each mutant strain and the experimental group of the reference strain. For significance analysis, two variables were of major importance. t-values stem from the difference between the data groups compared divided by the spreads of data. By comparing this to a critical value based on degrees of freedom, significance can be determined. Additionally, p-values (probability of occurrence by chance) were compared to a strict 0.05 cutoff. Using these comparisons helps determine whether a null hypothesis can be rejected.

Table 1: *Arabidopsis thaliana* height comparisons for significance between drought-treated & negative control groups within strains, as well as between drought-treated mutant strain and reference strain. Parameters utilized include sample sizes, critical (the cutoff for significance) & calculated t-values, degrees of freedom, and actual p-values (probability of occurrence by chance, 0.05 is the cutoff).

Plant Height (cm)		
Treatment aba 1-1 (experimental)	aba 1-1 (control) abi 1-1 (experimental) Ler-0 (control) Ler-0 (experimental)	Ler-0 (control)
Sample Size (n) 27	27 27 27 27	27
Critical t-value 2.007 2.007 2.007		
Calculated t-value 3.0216 4.0247 8.6344		
df (degrees of freedom) 52 52 52		
Actual p-value 0.0039 (<0.05) 0.0002 (<0.05) <0.0001 (<0.05)		
Conclusion Reject null hypothesis Reject null hypothesis Reject null hypothesis		
Treatment aba 1-1 (experimental)	Ler-0 (experimental) abi 1-1 (experimental) Ler-0 (experimental)	
Sample Size (n) 27	27 27 27	

Critical t-value 2.007 2.007

Calculated t-value 3.9541 0.5456

df (degrees of freedom) 52 52

Actual p-value 0.0002 (<0.05) 0.5877 (>0.05)

Conclusion Reject null hypothesis Failed to reject the null hypothesis

Table 2: *Arabidopsis thaliana* aboveground fresh weight comparisons for significance between drought-treated & negative control groups within strains, as well as between drought-treated mutant strain and reference strain. Parameters utilized include sample sizes, critical (the cutoff for significance) & calculated t-values, degrees of freedom, and actual p-values (probability of occurrence by chance, 0.05 is the cutoff).

Aboveground Fresh Weight (g)		
Treatment aba 1-1 (experimental)	aba 1-1 (control) abi 1-1 (experimental) abi 1-1 (control) Ler-0 (experimental)	Ler-0 (control)
Sample Size (n) 27	27 27 27 27	27
Critical t-value 2.007 2.007 2.007		
Calculated t-value 2.0536 5.8905 5.989		
df (degrees of freedom) 52 52 52		
Actual p-value 0.0451 (<0.05) <0.0001 (<0.05) <0.0001 (<0.05)		
Conclusion Reject null hypothesis Reject null hypothesis Reject null hypothesis		
Treatment aba 1-1 (experimental)	Ler-0 (experimental) abi 1-1 (experimental) Ler-0 (experimental)	
Sample Size (n) 27	27 27 27	

Critical t-value 2.007 2.007

Calculated t-value 4.5056 5.8513

df (degrees of freedom) 52 52

Actual p-value <0.0001 (<0.05) <0.0001 (<0.05)

Conclusion Reject null hypothesis Reject null hypothesis

Discussion

Considering the effect of drought on its own, it is obvious that it has some effect on plant growth and weight within individual strains. In all comparisons between the experimental and negative control groups within each strain, p-values fall drastically under the 0.05 threshold (5% of results being from chance) according to **Table 1** and **Table 2** apart from the aba1-1 weight measurements which lie close to the cutoff. Despite this outlier, all comparisons within strains can undoubtedly reject the null hypothesis due to great differences in data which indicates that drought likely did have an effect on growth. This can be further implicated from the calculated t-values being above the critical threshold portraying significance in another manner. Looking at comparisons made between experimental groups of mutants and

the reference does not provide much information regarding how drought affects a particular strain, but rather how drought affects each strain differently. In the case of *abi1-1* to Ler-0 experimental group comparisons, they are not well correlated as indicated from p-value and t-values being higher and lower than their cutoffs respectively, thus failing to reject the null hypothesis. As seen from **Figure 1** and **Figure 2**, Ler-0 sees a more drastic change (decrease) in both height and weight from drought in comparison to other strains.

Examining the physiological nature of *Arabidopsis*, ABA which is lacking in *abi1-1* likely means it can never respond to stress stimuli, so its growth remained similar or greater than its control as predicted as seen in both figures. It is well documented that the stress hormone ABA inhibits cell division and elongation in primary meristems which determine upward growth, as an attempt to conserve resources (Sun et al., 2022; Takatsuka et al., 2019). Greater height is correlated to greater weight as seen in the similar trends within strains in both figures. In the case of *abi1-1* where ABA is produced but the plant's response is weak, its growth was slightly inhibited due to drought as portrayed in both figures. An analogous comparison to this would be the weak but not completely voided response to insulin in some type 2 diabetes patients. Great decreases in Ler-0 height and weight from drought point towards the effect of ABA under regular conditions. These findings support the fact that a drought's effect on plants is dependent on the plant's ability to produce and/or respond to ABA, generally reducing the height and weight of plants with normal ABA production and response abilities as initially hypothesized.

The great magnitude of standard deviation error bars in **Figure 2** displaying weight indicates varied growth. A cause would be the random nature of leaf growth which could account for weight differences. Sources of error may arise from the planting pattern itself, perhaps favouring uptake of water in the central seed where its roots have more room to grow. Error bars in **Figure 1** could be explained by human error and uncertainties in ruler measurement, given its margins. Expansion of this study could be carried out in other members of the *Brassicaceae* family or in other plants with readily sequenced genomes to verify the effect of drought and ABA on growth. Applications of inhibition can be explored in the herbicide industry, perhaps to find mutagens that instead of inhibiting, stimulate ABA production when needed. Using this knowledge of plant response to drought stress provides broader scope in terms of plant evolution and adaptation in light of a planet facing climate change.

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Elucidating the mechanisms of the correlation between transcription factors HEBAIt and Runx3 during T cell development

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Introduction

T-cells serve a primary role in adaptive immunity. As such, T-cell immunodeficiency may result in disorders such as severe combined immunodeficiency (SCID) and DiGeorge syndrome, thus motivating the elucidation of T-cell development [1-2]. Investigating the molecular mechanisms of T-cell development could potentially inform disease immunopathology as well as guide the establishment of immunotherapies and disease models.

Overview of T-Cell Development

Originating from bone marrow progenitors, progenitors of T-cells called early thymic progenitors (ETPs) colonize the intrathymic environment and migrate from the cortical region to the medullary region [1, 3]. During migration, developing T-cells are double negative (DN) for CD4 and CD8 and differentially express CD44 and CD25, subclassified as the DN1 (CD44+/CD25-), DN2 (CD44+/CD25+), DN3 (CD44-/CD25+), and DN4 (CD44-/CD25-) developmental stages (Figure 1) [4]. During the DN3 stage, thymocytes bifurcate either towards the $\alpha\beta$ T-cell lineage or towards the $\gamma\delta$ T-cell lineage depending on differential expression of pre-T-cell receptor (TCR) and TCR $\gamma\delta$ (Figure 2) [5].

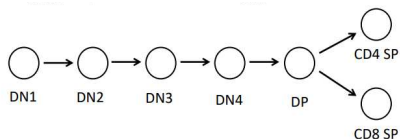


Figure 1. CD4-/CD8- double negative (DN) developmental stages. (Godfrey et al., 1993)

For the $\alpha\beta$ lineage, the beta chain of the TCR undergoes gene rearrangement to express pre-TCR β [6]. The pre-TCR is a complex of the rearranged TCR β gene, CD3 γ , δ , ϵ , and ζ chains, and pre-Ta (pTa) [7-8]. Exit from the DN3

stage into the $\alpha\beta$ lineage is pre-TCR ζ -dependent in which only thymocytes that underwent productive TCR β rearrangement and pre-TCR expression are selected and permitted to develop past the DN3 stage [6-7]. Subsequently, DN4 cells transit into the CD8+ immature single positive (ISP) stage and into the CD4+/CD8+ double positive (DP) stage during which TCR α rearrangement occurs [7]. These cells then mature into CD4+ or CD8+ single positive (SP) $\alpha\beta$ T-cells (Figure 2) [6, 9-10]. For the $\gamma\delta$ lineage, the $\gamma\delta$ TCR complex interacts with its cognate ligands to induce the expression of inhibitor of DNA binding 3 (*Id3*), which promotes the $\gamma\delta$ phenotype and represses the $\alpha\beta$ phenotype. Importantly, *Id3* is a repressor of E proteins via sequestration, leading to inhibition of the DNA-binding abilities of E proteins such as HEBAlt [11-12]. E proteins are a group of transcription factors containing a basic helix-loop-helix (bHLH) domain adjacent to a DNA-binding domain [8].

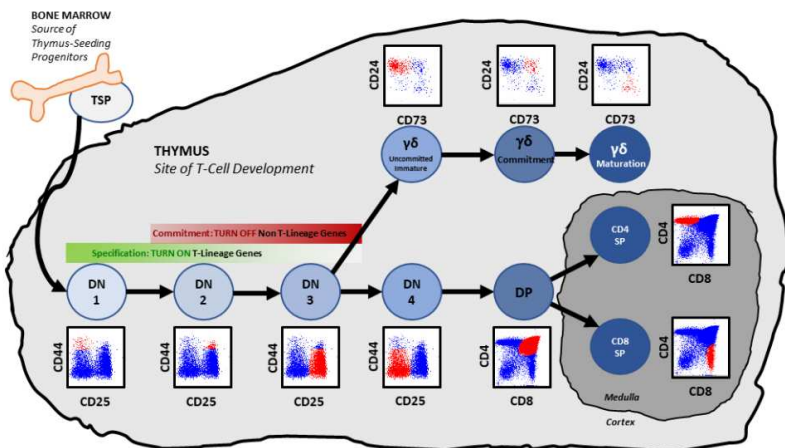
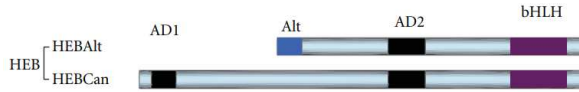


Figure 2. Overview of mouse T-cell development (Yoganathan, 2006).

The Role of Transcription Factors in T-Cell Development

Lineage-specific regulatory genes dictate T-cell development, thus compelling the elucidation of gene regulatory networks active at each developmental stage [13-16]. Of particular interest are the E protein called HeLa E-box binding factor (*HEB*) and Runt-related transcription factor 3 (*Runx3*). The *HEB* gene encodes for a Class I basic helix-loop-helix (bHLH) E protein



expressed in two variants: the canonical HEB protein (HEBCan) and the shorter alternative HEB protein (HEBAIt) (Figure 3) [13, 17-19].

Figure 3. The HEB gene encodes for two isoforms: the canonical HEB protein (HEBCan) and the shorter alternative HEB protein (HEBAIt). (Braunstein et al., 2012).

Importantly, HEBAIt contains a triple tyrosine (YYY) regulatory motif; phosphorylation of the YYY motif by Janus protein tyrosine kinases (JAK) has been shown to activate HEBAIt [20]. HEBAIt is upregulated during the DN2 to DN3 stages and permanently downregulated upon entrance into the double positive (DP) stage (Figure 4). HEBAIt expression has been shown to play critical roles in early T-cell developmental processes, including pre-T-cell receptor signaling and α -selection [13, 17, 21-23]. Specifically, deficiency of E2A proteins—which are bHLH factors that heterodimerize with HEB factors—permits transit past the DN3 stage in mutant thymocytes without a rearranged TCR, suggesting that HEB proteins might also block development at DN3 [23-24]. To bypass this block, thymocytes downregulate HEBAIt expression and upregulate Id3 expression (Figure 4) [8, 24]. Following HEBAIt downregulation, Runx3 expression is upregulated (Figure 4) and sustained through the DP stage where Runx3 plays a critical role in the SP CD4-CD8 $\alpha\beta$ T-cell lineage choice by repressing CD4 expression and promoting CD8 expression [25]. For the $\alpha\beta$ T-cell precursors, Runx3 is expressed as a longer transcript throughout development. For the $\gamma\delta$ T-cell precursors, after DN3, Runx3 is expressed as a shorter transcript [5].

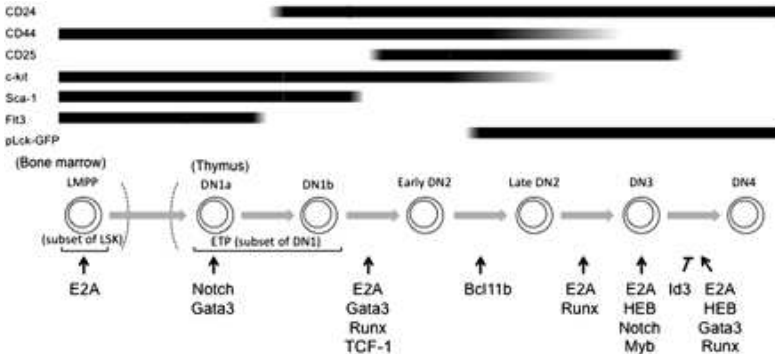


Figure 4. Overview of the transcriptional regulation of T-cell development (Roels et al., 2020).

Rationale & Hypothesis

While HEBAIt and Runx3 both play critical roles during early T-cell development, the mechanisms of the correlation of their expressions have yet to be fully explicated. Previously, it has been shown that transgenic HEBAIt reconstitution of HEB-deficient cells permits development past β -selection and into the DP stage, hence resulting in CD4 upregulation [26]. It is also known that Runx3 represses CD4 expression [25]. Moreover, HEBAIt overexpression in DN3 cells results in Runx3 downregulation [27]. However, the relationship between HEBAIt and Runx3 factors have yet to be explored. Accordingly, I hypothesize that HEBAIt factors repress Runx3 expression or activity (Figure 5). Under this hypothesis, HEBAIt factors repress Runx3 expression or activity to enable CD4 upregulation and transition past the DN3 stage.

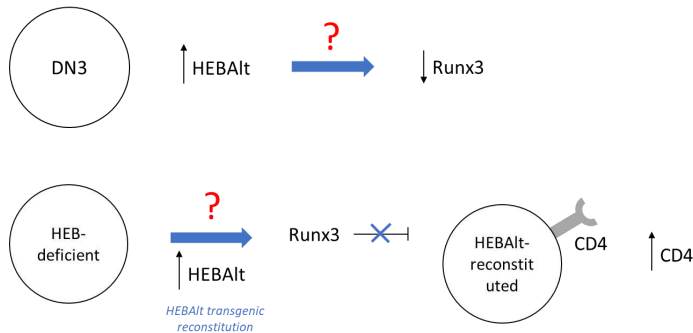


Figure 5. HEBAIt factors potentially repress Runx3 expression or activity.

Methods

SCID.adh cells as a model system:

To investigate this hypothesis, we need to simultaneously express HEBAIt and Runx3. Retroviral transfection of constructs conferring varying levels of HEBAIt transcriptional activity into SCID.adh cells was performed to induce and maintain HEBAIt expression. SCID.adh cells derived from a spontaneous thymic lymphoma from severe combined immunodeficient (SCID) mice were chosen as the model system for the following reasons. Transition out of the

DN3 stage of transfected SCID.adh cells was then induced by activating signaling pathways downstream of TCR rearrangement.

Notably, our experimental approach addresses the following complexities. First, HEBAIt expression diminishes after the DN3 stage and the onset of Runx3 expression begins shortly after DN3 [22, 26]. SCID.adh cells are developmentally arrested at the DN3 stage, enabling analysis at the point where HEBAIt expression is upregulated and Runx3 expression is downregulated. Second, HEBAIt blocks development past DN3 in cells lacking pre-TCR expression [8, 24]. As such, inducing transition past the DN3 stage enables us to create a condition wherein HEBAIt and Runx3 are both expressed. Third, SCID.adh cells harbor a mutation that prevents proper TCR gene rearrangement [28]. Thus, we activated signaling pathways independent of TCR rearrangement to induce this transition out of the DN3 stage. Furthermore, SCID.adh cells are amenable to HEBAIt expression manipulation as well as biochemical perturbations including cell stimulation agents. SCID.adh cells also allow for cell sorting and analysis via fluorescence-activated cell sorting (FACS) and flow cytometry, yielding a productive expression readout for downstream analysis [29].

HEBAIt Mutant Groups:

Experimental groups consisted of three mutant SCID.adh lines with varying levels of HEBAIt transcriptional activity (Figure 6-7). First, SCID.adh cells were transfected with constructs containing the WT HEBAIt sequence with the WT triple tyrosine (YYY) regulatory motif. Second, SCID.adh cells were transfected with constructs containing a triple glutamic acid (EEE) mutation, which is a kinase-independent mutation that confers a negative charge normally conferred by phosphorylation, thus enhancing HEBAIt transcriptional activity by approximately ten-fold relative to the wildtype (WT) phenotype. Third, SCID.adh cells were transfected with constructs containing a triple phenylalanine (FFF) mutation, which prevents phosphorylation as phenylalanine lacks a necessary negative charge, thus reducing HEBAIt transcriptional activity by approximately three-fold relative to the WT phenotype (Figure 6). Parental SCID.adh cells, which express endogenous levels of HEBAIt, served as the control group [20, 27].

ALT MYCAYPVPGMGNNSLM**YYY**NGKT
 FFF MYCAYPVPGMGNNSLM**FFF**NGKT
 EEE MYCAYPVPGMGNNSLM**EEE**NGKT

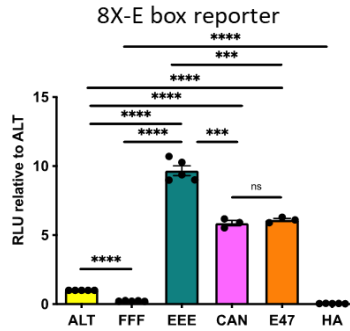


Figure 6. HEBAIt transcriptional activity can be altered by introducing various mutations at the YYY motif (Anderson et al., unpublished data).

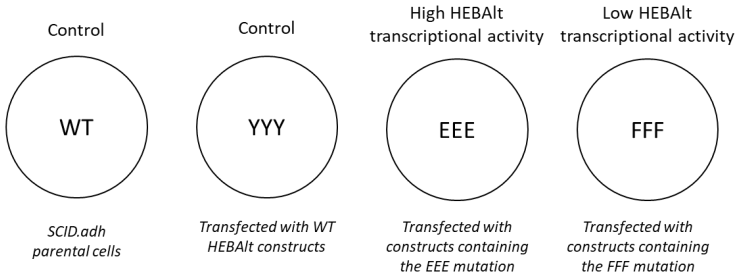


Figure 7. Summary of the HEBAIt mutant groups: WT, YYY, EEE, and FFF.

Cell culture and T-cell activation:

SCID.adh cells were grown in RPMI media for three days, after which 1×10^6 cells were plated on 24-well plates coated with anti-TAC (anti-human interleukin-2 receptor alpha (IL-2R α)) antibodies. Anti-TAC antibodies were used to stimulate TCR-driven activation pathways via CD3 ϵ signaling [29]. Subsequently, various activating agents—interleukin-7 (IL-7), phorbol 12-myristate 13-acetate (PMA), and ionomycin—were added to the cell culture media and remained for 16 hours, which activated signaling pathways downstream of TCR rearrangement (Figure 8); note that this approach bypasses the requirement for a properly arranged TCR. Interleukin-7 (IL-7) activates JAK kinases, which activate HEBAIt transcriptional activity by

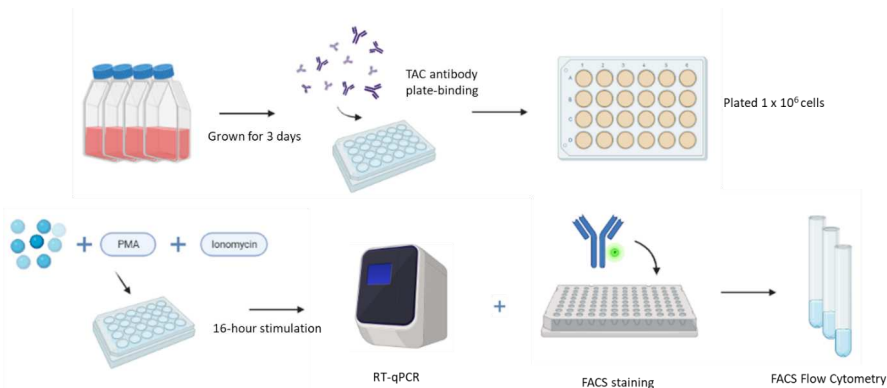


Figure 8. SCID.adh cell stimulation and analysis pipeline. Figure prepared using BioRender:

phosphorylating the YYY regulatory motif [20, 30]. PMA stimulates protein kinase C (PKC), which transduces mitogen-activated protein kinase (MAPK) phosphorylation pathway signals downstream of pre-TCR activation [31]. Finally, ionomycin activates the transcription factor nuclear factor of activated T cells (NFAT) via intracellular calcium influx that mimics TCR-induced calcineurin activation. NFAT signaling is crucial for the expression of key cytokine genes and other relevant transcription factors for proper T-cell development [32].

RT-qPCR and Flow Cytometry:

Successful stimulation was characterized by the following markers of TCR signaling, β -selection, and/or γ -selection. CD25 and recombina-activating gene (RAG)1 downregulation indicate exit from the DN3 stage during which gene rearrangement would normally occur in WT mice. Upregulation of Sox13 transcription factors, which repress the $\alpha\beta$ lineage and promote the $\gamma\delta$ lineage, suggest that entry into γ -selection [33]. Upregulation of CD8 alpha chain (CD8a) expression would suggest β -selection, potentially indicating a preference for $\alpha\beta$ T-cell development [34]. Note that the cell stimulation protocol underwent several rounds of optimization in which the reagents and reagent concentrations were modified, and the stimulation time was decreased.

Following the 16-hour stimulation, samples of stimulated cells were collected for RT-qPCR and remaining replicates were stained for FACS flow cytometry

(Figure 8). The genes of interest for RT-qPCR analysis were RAG1, HEBAIt, Runx3, CD8a, Sox13, CD69, and Id3. Expression was quantified relative to the expression of the housekeeping gene beta-actin (β -actin). CD25 PE/Cy7, CD28 PE, CD24 APC, CD5 APC Cy7, and CD25 PER CP5.5 antibodies were used for FACS staining.

Results

Stimulated SCID.adh cells exhibited gene expression changes similar to the gene expression changes of activated WT T-cells:

Stimulated SCID.adh cells exhibited gene expression changes similar to changes observed in activated (Ac) WT T-cells following pre-TCR expression as evidenced by the RT-qPCR results. First, compared to the unstimulated samples, the stimulated YYY, EEE, and FFF mutant groups all exhibited a dramatic decrease in RAG1 expression relative to β -actin expression (Figure 9A). Downregulation of RAG1, which is required for V(D)J recombination, is characteristic of exit from the DN3 stage. Second, compared to the unstimulated samples, the stimulated mutant groups also exhibited an increase in both CD8a and Sox13 expression relative to β -actin expression (Figure 9B-C); this observation suggests that the cells are entering either β -selection or γ -selection, respectively. Overall, these results suggest a strong genetic breakthrough from the DN3 stage, indicating a successful activation.

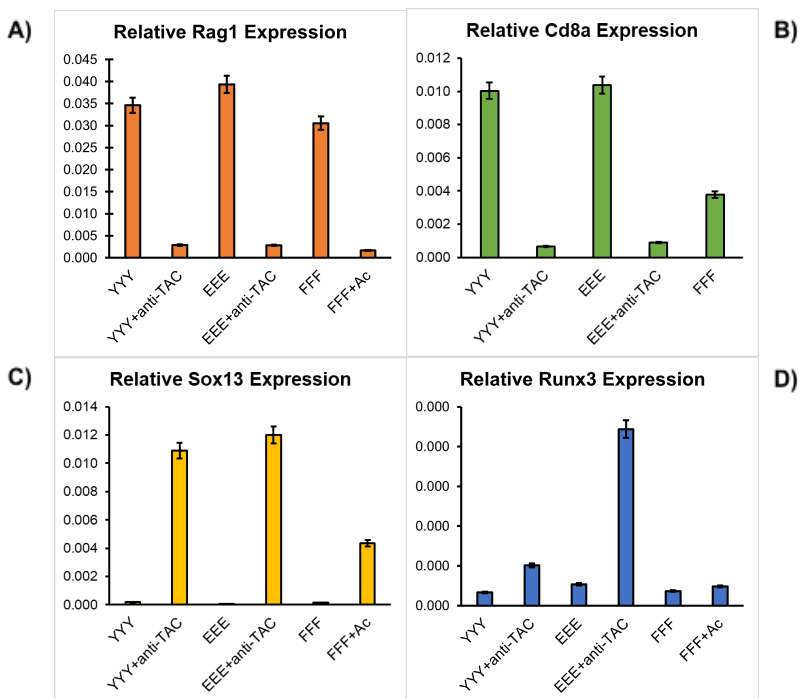


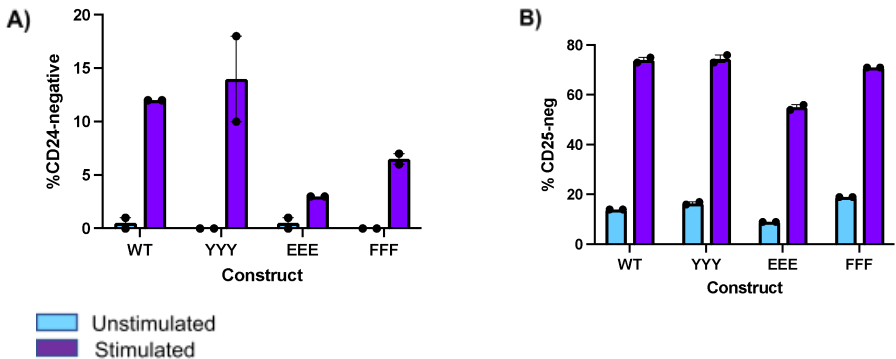
Figure 9. (a) Strong *RAG1* downregulation suggests exit from DN3. (b) Strong *CD8a* upregulation suggests transit into beta selection. (c) Strong *Sox13* upregulation suggests transit into gamma selection. (d) *Runx3* is minimally expressed despite successful stimulation.

***Runx3* is minimally expressed despite successful DN3 breakthrough:**

However, while there is strong genetic evidence for a breakthrough from DN3 into selection, *Runx3* is barely expressed in the stimulated cells (note scale) (Figure 9D). Given that the onset of *Runx3* expression occurs around the DP stage, lack of *Runx3* expression suggests that the cells have only just transited past the DN3 stage but not into the DP stage. Accordingly, understanding whether HEBAIt factors repress *Runx3* expression or activity will require further experiments.

***CD24* diminishment suggests transit into gamma-delta selection rather than beta-selection:**

On the molecular level, expression of cell surface markers corroborates genetic evidence for the successful activation of the WT, YYY, and FFF mutant groups, except in the EEE group. FACS analysis revealed increases in expression of co-stimulatory molecules CD27 and CD28, which indicate cell activation (data not shown) [35]. Furthermore, a decrease in the expression of costimulatory molecule CD24 suggests that the activated cells favor the $\gamma\delta$ lineage over the $\alpha\beta$ lineage as $\gamma\delta$ -specified T cells downregulate CD24



expression upon maturation (Figure 10A) [11, 36-37].

Figure 10. (a) CD24 diminishment suggests transit into gamma-delta selection rather than beta selection. (b) CD25 diminishment suggests exit from DN3 (CD44-/CD25+) into DN4 (CD44-/CD25-).

CD25 diminishment suggests exit from the DN3 stage into the DN4 stage:

Strong decreases of cell surface CD25 in the WT, YYY, and FFF groups further evidence cell exit from the DN3 (CD44-/CD25+) developmental stage (Figure 10B). As previously described, the EEE mutants are SCID.adh cells transfected with constructs containing a triple glutamic acid (EEE) mutation at the YYY regulatory motif in HEBAlt, which confers higher HEBAlt transcriptional activity. With the EEE mutant group, there was less CD25 diminishment (i.e. less decreased amounts of CD25+ DN3 cells) between the unstimulated and stimulated groups, suggesting a partial block at DN3 (Figure 10B & Figure 11). As shown in Figure 11a, there is a dense red hot spot population of CD25+ DN3 cells in the unstimulated group of approximately 91.2% CD25+ DN3 cells. In comparison, in Figure 11b, the density of CD25+ DN3 cells disperse and decrease in the stimulated group for a population of approximately 45.3% CD25+ DN3 cells. While RT-qPCR results support robust cell breakthrough on the genetic level, FACS analysis suggests that EEE mutants experience a partial developmental block at DN3 on the cell surface level (Figures 9-11); this observation may be attributed to potential HEBAlt-mediated activation of CD25 expression, leading to increased amounts of CD25+ DN3 cells for the stimulated EEE group.

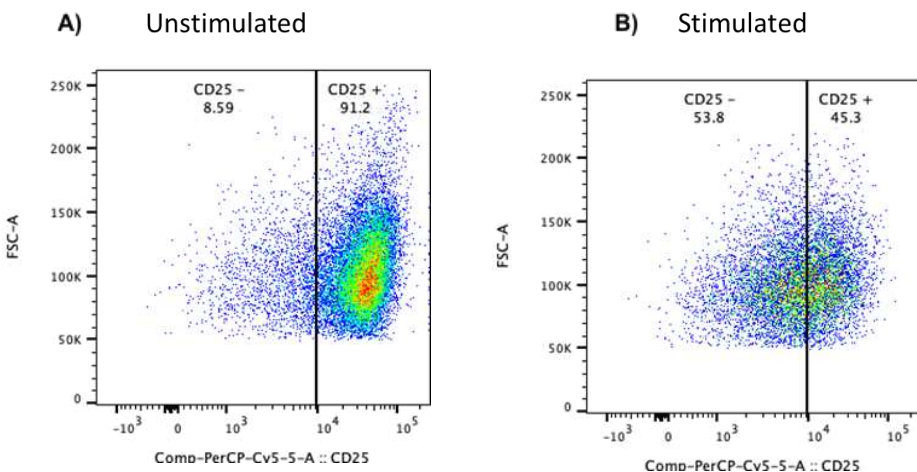


Figure 11. *Lower CD25 diminishment in EEE mutants between the unstimulated (Figure 11a) and stimulated (Figure 11b) suggest a potential role for HEBAIt in permitting CD25 expression.*

Conclusion

Given the successful activation of the SCID.adh cells, it is shown that a strong genetic breakthrough into either beta selection or gamma selection can be induced in SCID.adh cells using activators of pathways downstream of TCR signaling. With regard to the hypothesis, it is inconclusive whether HEBAIt regulates Runx3 expression or activity to enable CD4 upregulation and transition past the DN3 stage. However, we demonstrate that HEBAIt potentially activates CD25 expression during the DN3 to DN4 transition, yielding a non-activated phenotype on the cell surface level despite strong breakthrough on the genetic level. Follow-up studies may include further optimization of the stimulation protocol to reach the DP stage at which Runx3 expression is induced as the SCID.adh cells only exhibited breakthrough past the DN3 stage. Accordingly, this would allow for the analysis of concurrent Runx3 and HEBAIt expression in the context of T-cell development. In addition, given the lower CD25 diminishment in the EEE mutant Other studies include further investigation of the potential roles of HEBAIt in CD25 activation.

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dFe, $\delta^{56}\text{Fe}$, and pFe profiles in the Pacific, Atlantic, and Indian Oceans using the GEOTRACES IDP2021 Database

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Introduction

The concentration and distribution of iron (Fe) isotopes regulate autotrophic activity in many oceanic regions. A variety of processes controls oceanic concentration and distributions of trace metals in the ocean (Bruland & Lohan, 2003). These processes include the transportation of trace metals via rivers along ocean boundaries, aeolian dust from arid and semi-arid terrestrial regions, and hydrothermal activity along mid-ocean ridges (MORs) (Bruland & Lohan, 2003). In addition, oceanic trace metal cycling and scavenging processes strongly influence the concentration and distribution of Fe (Bruland & Lohan, 2003). Trace metal scavenging uses adsorption, a form of surface complexation, to remove metals from the ocean. There are lower concentrations of dissolved Fe (dFe) in remote oceanic surface waters and in higher concentrations with increasing depth (Bruland & Lohan, 2003). Although Fe is the fourth most abundant element in the Earth's crust, lower Fe concentrations are observed in the ocean because Fe has low solubility under oxidizing conditions.

Hydrothermally derived Fe is significant because in regions of higher concentration, namely hydrothermal vent communities, Fe facilitates microbial chemosynthetic metabolism (Li et al., 2014). Two types of hydrothermal vents include source and diffuse vents. Diffuse venting occurs at lower temperature and pH than source venting. Hydrothermally derived dissolved trace metals have been documented by oceanographers in all ocean basins (Fitzsimmons et al., 2017). Basin scale distributions of Fe and its isotopes provide a further understanding of the biogeochemical cycling of Fe as a growth-limiting micronutrient in the ocean (John et al., 2018).

In this literature review, we examined the distribution of dFe, stable isotope Fe ($\delta^{56}\text{Fe}$), and particulate Fe (pFe) in the Pacific, Atlantic, and Indian Oceans, as well as the Fe transport behaviour surrounding its diffusion in the Indian and source hydrothermal vents in the Atlantic and Pacific Oceans. Fe dissolves in oxygen-rich waters, being converted to dFe. $\delta^{56}\text{Fe}$ is the most common form of stable isotope Fe. pFe forms through complexation with organic ligands and the formation of Fe sulfide colloidal nanoparticles. pFe concentrations are generally significant near hydrothermal vents (Fitzsimmons et al., 2017). Although the role of Fe as a nutrient and a metabolism facilitator

is known, there is limited seafloor sampling, including sediment and water samples, and thus the function of hydrothermal Fe remains unclear.

Methods

Using the GEOTRACES IDP2021 Database, we mapped newly acquired Fe data from research cruises to help further promote the understanding of oceanic Fe distributions in the Pacific, Atlantic, and Indian Oceans. The GEOTRACES IDP2021 Database contains hydrographic and marine geochemical data (ex., micronutrients, stable isotopes, and contaminants) from research cruises (GEOTRACES IDP2021). We analyzed and interpreted the dFe, $\delta^{56}\text{Fe}$, pFe in the Pacific, Atlantic, and Indian Oceans using the US GEOTRACES transects GA03, GP16, GI05, and GI05 by observing the dFe, $\delta^{56}\text{Fe}$, pFe depth profiles. We used the eGEOTRACES Electronic Atlas. We used the data groups: dissolved trace elements, dissolved trace element isotopes, and particulate trace elements. We used the tracers: Fe dissolved, delta Fe_56_54, and Fe total particulate.

Results

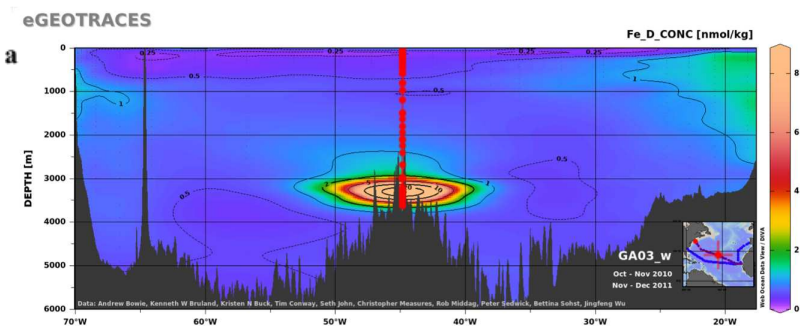
1. dFe and $\delta^{56}\text{Fe}$ profiles from Transect GA03

The GA03 North Atlantic transect cruise in 2011 surveyed from Mauritania to Woods Hole. In Figures 1a–b, we present the dFe and $\delta^{56}\text{Fe}$ profiles from the GA03 transect we mapped. The main dFe source along the transect is subaerial Saharan dust aerosols from Western Africa. Additional sources of Fe include oxidized Fe emissions from oxygenated North American basin sediments, reductive Fe input from Western African basin sediments, and hydrothermally derived Fe from the mid-Atlantic Ridge (MAR). Although hydrothermal venting contributes only 2–6% of Fe along the GA04 transect, Conway and John argue that hydrothermal Fe buffers dFe concentrations when other Fe sources are depleted (2014). Redox reactions in hydrothermal fluid affect the dFe concentrations (GEOTRACES IDP2021). Hydrothermal venting produces isotopically light Fe. The isotopically light Fe can change surface productivity in the ocean as Fe isotopes are distributed away from the ridge axis by lateral deep ocean currents. The transportation of Fe by ocean currents can enhance Fe concentration away from the ridge axis. Redox reactions in hydrothermal fluid affect the dFe concentrations. Fe (II) is rapidly oxidized and scavenged by organic ligands to form oxy-hydroxide (Fe (III)) particles (Hawkes et al., 2013).

dFe is an important source of Fe in the Atlantic Ocean. Figure 1a shows dFe concentrations along the GA03 transect. We found the highest dFe levels

at the Trans-Atlantic Geotraverse (TAG) station, along the Mid-Atlantic Ridge (MAR). The TAG station is located at 44.827°W, 26.136°N. This elevated dFe indicates the presence of a hydrothermal plume. There are approximately 3.0–8.5 nmol/kg of dFe around 40°W–50°W. The dFe levels surrounding the hydrothermal plume are concentrated, providing evidence for a source vent. The surrounding seawater has a lower dFe concentration, approximately 0.25–0.50 nmol/kg. The dFe near the Mauritania surface waters in the eastern basin (20°W–25°W) and the North American surface waters in the western basin (70°W–75°W) have slightly elevated dFe levels, approximately 1.8–2.0 nmol/kg. This elevation in dFe suggests that eastern and western coastal surface waters are Fe-rich. Elevated levels of dFe in the western basin occur at a depth of around 600–1,500m (Hatta et al., 2015).

We found that the highest $\delta^{56}\text{Fe}$ values occur at around 30°W–60°W, with values greater than +0.75‰, as displayed in Figure 1b. These values are isotopically heavy, providing evidence for depleted dFe levels. The continental mixed surface layer near the Mauritania and North America margins has isotopically light $\delta^{56}\text{Fe}$ values of +0.25‰. These are isotopically light $\delta^{56}\text{Fe}$ values, indicating an elevated level of Fe in the water (Conway & John, 2014).



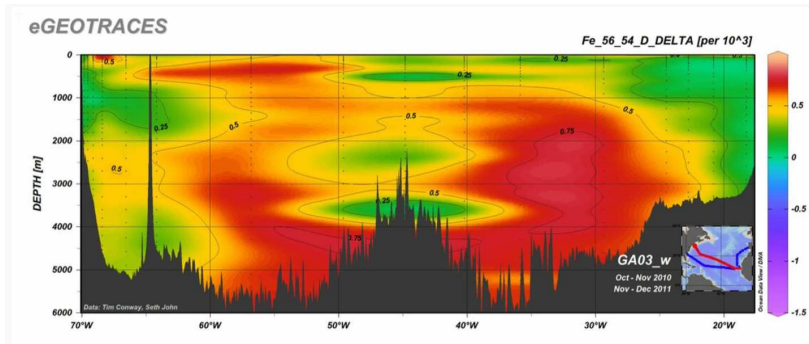
b

Figure 1. dFe and $\delta^{56}\text{Fe}$ profiles in the GA03 transect. **(a)** dFe concentrations along the GA03 transect. **(b)** $\delta^{56}\text{Fe}$ values along the GA03 transect. Red correlates to higher dFe concentrations and heavy $\delta^{56}\text{Fe}$ values while purple correlates to lower dFe concentrations and light $\delta^{56}\text{Fe}$ values (GEOTRACES IDP2021).

2. dFe, pFe, and $\delta^{56}\text{Fe}$ profiles from Transect GP16

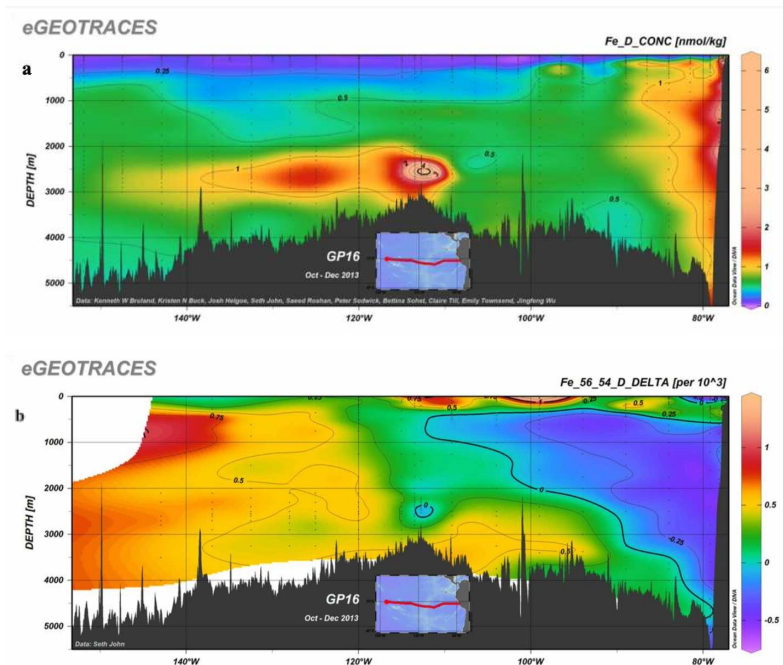
The GP16 Tropical Pacific transect cruise in 2013 surveyed from Peru to French Polynesia. In Figures 2a–c, we present dFe, $\delta^{56}\text{Fe}$, and pFe profiles we mapped from the GP16 transect. The main objective of the GEOTRACES GP16 transect was to determine the behaviours of hydrothermally derived trace elements along the South East Pacific Rise (SEPR). The Peruvian basin is one of the world’s largest Oxygen Minimum Zones (OMZs). OMZs are an important component affecting oceanic Fe concentration. In the OMZ, dFe in the bottom waters upwell to the surface waters. The dFe is then consumed by microorganisms and remineralized. Fe is highly soluble in oxygen-depleted waters (Fitzsimmons et al., 2017; John et al. 2018).

Figure 2a shows the dFe concentration from GP16. The western basin has a lower dFe concentration (approximately 0.75 nmol/kg) than the eastern basin, (1.5 – 6 nmol/kg). We observed high dFe concentrations (approximately 6 nmol/kg) near 80°W (Peruvian margin). Peruvian margin maximum dFe concentrations occur at depths 100–3,000m and 1,000m west from the continental margin. dFe increases near 117°W (approximately 6.0 nmol/kg), providing evidence for the SEPR hydrothermal plume (Fitzsimmons et al., 2017; GEOTRACES IDP2021; John et al. 2018).

The Peruvian margin in the eastern basin has a light $\delta^{56}\text{Fe}$ signature (-0.25‰) while the western basin has a heavy signature (+0.75‰), as shown in Figure 2b. The heavy $\delta^{56}\text{Fe}$ signature in the western basin occurs from

500–1,700m depth and 4,000m laterally. An increase in light $\delta^{56}\text{Fe}$ signature occurs near 117°W (approximately -0.15‰), providing evidence for a hydrothermal plume. Recall that light $\delta^{56}\text{Fe}$ values are typical for Fe undergoing oxidation to become dFe and precipitation. When Fe-rich hydrothermal fluids mix with seawater, most of the Fe is oxidized and precipitated, forming ore deposits (Fitzsimmons et al., 2017; GEOTRACES IDP2021; John et al. 2018).

We found that pFe levels increased near the SERP (117°W), shown in Figure 2c. The pFe levels near the SERP are approximately 40 nmol/kg, indicating the presence of a hydrothermal plume. This dFe elevation supplements the increased dFe levels from Figure 2a. The pFe levels decrease more rapidly than the dFe levels (Fitzsimmons et al., 2017; GEOTRACES IDP2021; John et al. 2018).



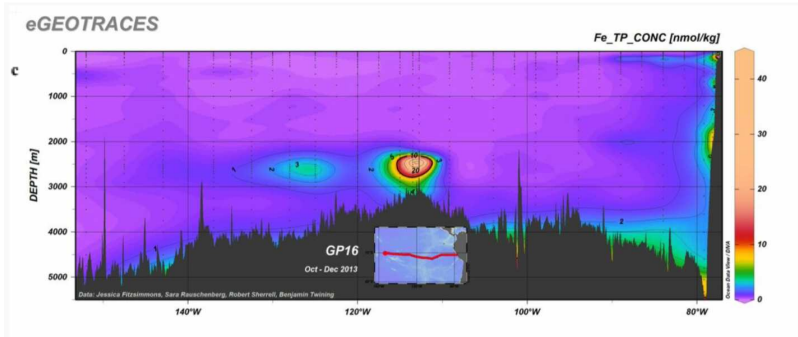


Figure 2. dFe, $\delta^{56}\text{Fe}$, and pFe profiles in the GP16 transect. **(a)** dFe concentrations along the GP16 transect. **(b)** $\delta^{56}\text{Fe}$ values along the GP16 transect. **(c)** pFe concentrations along the GP16 transect. Red correlates to higher dFe and pFe concentrations and heavy $\delta^{56}\text{Fe}$ values while purple correlates to lower dFe and pFe concentrations and light $\delta^{56}\text{Fe}$ values (GEOTRACES IDP2021).

a. dFe profile from Transect G104

The G104 Indian Ocean transect cruise in 2009 and 2010 was surveyed from Japan to South Africa. We mapped the dFe profile from the G104 transect to compare Fe distribution near diffuse vents from source vents. The G104 route surveyed along the Central Indian Ridge (CIR) and the South West Indian Ridge (SWIR). Fe sources along the G104 transect primarily include hydrothermal Fe from the CIR and oxidized continental margin Fe near the Arabian Sea. In the Indian Ocean, there is seasonal upwelling during monsoonal periods. The OMZ in the Indian Ocean is a product of monsoonal upwelling (Thi Dieu Vu & Sohrin, 2013).

We found high dFe levels in the Arabian Sea surface water (20°N), approximately 1.75 nmol/kg from 200–1,500m depth, compared to dFe in Indian Ocean surface water (approximately 0 nmol/kg). The localized increased dFe at hydrothermal sources occur between 5–20°S and at depths of 2,000– 3,800m, as displayed in Figure 3. The CIR dFe concentrations are lower than the MAR and SEPR dFe concentrations. Literature reviews cite lower dFe around diffuse hydrothermal vents compared to source hydrothermal vents, supporting the lower dFe levels around the CIR (GEOTRACES IDP2021; Nishioka et al., 2013; Toshitaka, 2010).

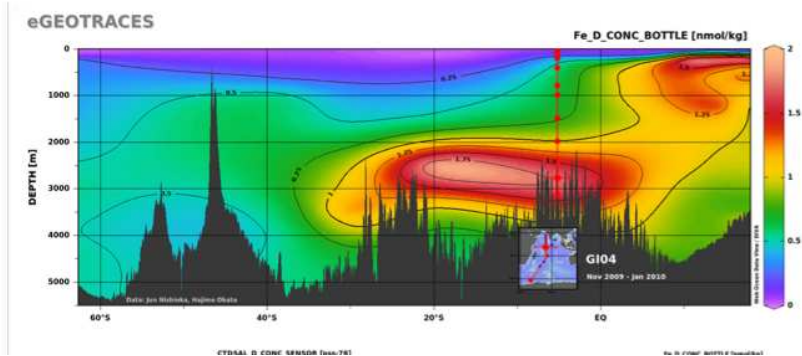


Figure 3: dFe concentrations from transect GI04. Red correlates to higher dFe concentrations while purple correlates to lower dFe concentrations (GEOTRACES IDP2021).

b. dFe profile from Transect GI05

The GI05 Northern Indian Ocean transect cruise in 2015 departed from Mauritius. We mapped the dFe profile from the GI05 transect to compare Fe distribution near diffuse vents from source vents, similar to GI04. The GI05 transect extended along the northern CIR. Literature reviews of lower dFe around diffuse hydrothermal vents compared to source hydrothermal vents support the dFe concentrations observed from GI05 (GEOTRACES IDP2021; Nishioka et al., 2013; Sajid, 2015).

We mapped the dFe profile from the GI05 transect, seen in Figure 4. The dFe level around the hydrothermal plume is approximately 2 nmol/kg, from depths 300–4,500m. The dFe concentration along both the northern and southern CIR sections are lower than the dFe concentrations observed along the MAR and SEPR. This observation complements the literature reviews of lower dFe surrounding diffuse hydrothermal vents and higher dFe concentrations near source hydrothermal vents. Additionally, the dFe along the northern CIR is transported further away from the ridge axis than the dFe transported along the MAR and SEPR in transects GP16 and GI04 respectively (GEOTRACES IDP2021; Nishioka et al., 2013; Sajid, 2015).

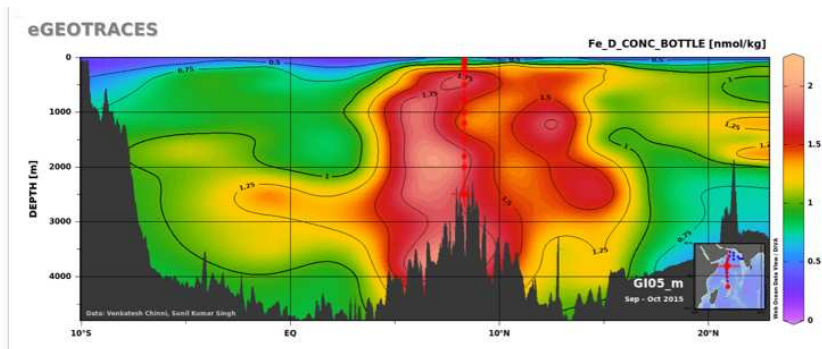


Figure 4: dFe from transect GI05. Red correlates to higher dFe concentrations while purple correlates to lower dFe concentrations (GEOTRACES IDP2021).

Discussion

1. dFe Concentrations

The typical dFe concentrations near hydrothermal vents are high compared to the surrounding seawater in all the transects (GA03, GP16, GI04, and GI05). In the GA03 transect, the highest dFe concentrations are found at the TAG station along the MAR, providing evidence for a hydrothermal plume. dFe near Mauritanian coastal waters is elevated. The surface water dFe concentrations near Mauritania are controlled by atmospheric Fe aerosols from subaerial Saharan dust. The Mauritanian OMZ is located at this elevated dFe region. The OMZ ranges from depths of 800–2,500m and 18°W–35°W (Conway & John, 2014; GEOTRACES IDP2021). Recall that OMZs are important oceanic components affecting Fe levels. The low solubility of Fe in oxygenated seawater, Fe reactivity, and marine microorganism metabolism all contribute to Fe being removed rapidly from the surface ocean. Therefore, Fe levels are usually highest close to source regions. Elevated dFe concentrations found in OMZs are due to remineralized benthic Fe that sinks from the surface water (Klar et al., 2018). Elevated levels of dFe in the western basin surface waters occur at a depth of around 600–1,500m. This dFe enrichment corresponds to the Atlantic waters mixing with the Upper Labrador Sea Water. The elevated dFe levels in Upper Labrador Sea Water are controlled by sediment input from the Newfoundland margin (Hatta et al., 2015).

The highest dFe values were found near the SERP hydrothermal plume in the GP16 transect, complementing the dFe concentrations observed in GA03. Fitzsimmons et al. (2017) conducted chemical speciation and isotopic

composition experiments to show that the components of dFe include nanoparticulate Fe (III) oxyhydroxides and an organically complex Fe phase. Fitzsimmons et al. (2017) also suggested that nanoparticulate Fe (III) oxyhydroxides dominate hydrothermally source dFe speciation near the SERP.

The high surface dFe levels in the Arabian Sea are due to aerosol Fe input from monsoons in the GI04 transect. The decline of dFe in the Indian Ocean indicates fewer Fe sources and possible Fe scavenging from phytoplankton growth in the Indian Ocean. The dFe shows a surface maximum at the OMZ. Thi Dieu Vu and Sohrin (2013) report the OMZ to be around 80–1500m in depth. Around 12–20°N and 3000–4000 m depth, dFe increases above the continental rise in the Arabian Sea. This dFe increase may be related to oxidized Fe emissions at the continental margin (Thi Dieu Vu and Sohrin, 2013). Elevated dFe concentrations in GI05 were discovered along the CIR, indicating a hydrothermal plume. The dFe concentrations in both GI04 and GI05 are lower than dFe concentrations observed in GA03 and GP16. This pattern suggests that the SWIR and CIR are diffuse vents rather than source vents along the MAR and SERP (Kim et al., 2020).

2. $\delta^{56}\text{Fe}$ Levels

Near hydrothermal vents, light $\delta^{56}\text{Fe}$ values were observed. The isotopically light values near the TAG station in GA03 are typical of Fe oxidation and precipitation. When Fe-rich hydrothermal fluids mix with seawater, most of the Fe is oxidized by the water and precipitated, forming ore deposits. Light $\delta^{56}\text{Fe}$ above the TAG station suggests that hydrothermal vents provide Fe to the surface gyre. Aerosol Fe fractionates during dissolution. The fractionation occurs from a ligand-mediated process pairing heavy Fe isotopes with effective Fe-binding ligands. There are light $\delta^{56}\text{Fe}$ values surrounding the hydrothermal plume TAG station, Mauritanian margin, and North American margin. This supply of hydrothermal Fe to the surface gyre indicates that hydrothermal Fe could behave as a buffer for the oceanic dFe during fluctuations in Fe from Saharan dust. The presence of lighter $\delta^{56}\text{Fe}$ closer to the surface near the North American margin is associated with deep nepheloid layers. A nepheloid layer is a layer of water in the deep ocean basin with elevated amounts of suspended sediments. The nepheloid layer suggests that the Fe source in this region is from suspended sediments (Conway & John, 2014; GEOTRACES IDP2021). Conway and John (2014) conducted calculations on $\delta^{56}\text{Fe}$ levels. These calculations imply that shelf advection contributes to 10–30% of dFe. Within a few hundred km of the margin, reductive sediments account for 20–30% of the dFe throughout the water column. These distribution results indicate that the hydrothermal Fe supply to

the surface ocean could behave as a buffer for the oceanic dFe during inconsistent Fe input from aerosols (Conway & John, 2014; GEOTRACES IDP2021; Hatta et al., 2015).

Chemical speciation and isotopic composition analyses performed by Fitzsimmons et al. (2017) reveal that pFe consists of Fe (III) oxyhydroxides in the GP16 transect. The Peruvian basin has a light $\delta^{56}\text{Fe}$ signature and high dFe values while the western basin has a heavy signature and low dFe values. $\delta^{56}\text{Fe}$ values are $\sim -0.15\%$ near the SERP. Recall that light $\delta^{56}\text{Fe}$ values are characteristic of Fe oxidation and precipitation. When Fe-rich hydrothermal fluids encounter seawater, most of the Fe is oxidized and precipitated. Reduced Fe (II) is water soluble whereas oxidized Fe (III) precipitates unless bound to and stabilized by an organic ligand (Fitzsimmons et al., 2017; GEOTRACES IDP2021; John et al., 2018). Fitzsimmons et al., (2017) suggest that heavy $\delta^{56}\text{Fe}$ organic complexes dominate the hydrothermal dFe distal to the SERP, affecting the Pacific Ocean dFe sink.

3. pFe Concentrations

pFe concentrations were found to be highest near hydrothermal vents. pFe decreases exponentially compared to the decrease of dFe away from the hydrothermal plume along the SERP in the GP16 transect. This pattern suggests that pFe is subject to aggregative removal from the hydrothermal plume. pFe settles due to gravity in aggregative removal as the mass of the Fe becomes too large to be suspended and/or dissolved in the seawater. Fitzsimmons suggests that the pFe aggregates onto biogenic or lithogenic particles settling from the surface waters (Fitzsimmons et al., 2017; GEOTRACES IDP2021; John et al., 2018).

4. dFe in Diffuse Hydrothermal Vents

The concentration of dFe surrounding diffuse hydrothermal vents is lower than that of source hydrothermal vents. The dFe levels from both GI04 and GI05 are very low, suggesting that diffusion hydrothermal vents are present in the Indian Ocean. The lower dFe levels indicate that the hydrothermal fluids from the CIR and SWIR were diluted when the seawater penetrated the ridge flank through fissures along the seafloor and fault zones. Elements and heat exchange between the Earth's crust and oceans in the ridge flank. Diffuse venting is common along ridge crests and ridge flanks in the Indian Ocean. Along the Indian Ridge, pFe is mainly formed when sulfide and Fe-oxyhydroxides precipitate. Although I did not plot pFe data from the GI04 and GI05 transects, Kim et al. (2020) noted that Fe precipitation and aggregate removal depleted dFe in the Indian Ocean by about 50%.

Conclusion

We mapped the dFe, $\delta^{56}\text{Fe}$, and pFe concentrations from the GEOTRACES transect GA03, GP16, GI04, and GI05 to further understand the behaviour and sources of Fe in oceans. I observed increased dFe and pFe levels, and isotopically light $\delta^{56}\text{Fe}$ surrounding hydrothermal vents in the transects. Isotopically light $\delta^{56}\text{Fe}$ signature indicates the presence of a hydrothermal plume. Therefore, isotopically light $\delta^{56}\text{Fe}$ corresponds to elevated levels of pFe and dFe. Understanding Fe behaviour in oceans is important because Fe availability controls primary production and carbon cycling throughout the ocean.

Although hydrothermal-derived Fe is an insignificant source of Fe, the impact of hydrothermal vents on global dFe distribution is still poorly known. This lack of understanding is due to high spatial and temporal variability in hydrothermal fluid emissions and the complexity of Fe speciation and removal in seawater (Hawkes et al., 2013). Using geospatial software (ArcGIS) to map the ocean floor, we can further understand the distribution of hydrothermal vents and link that to the distribution of hydrothermal-derived Fe.

In addition, future research should track dFe along the vertical water column as dFe is ejected from hydrothermal vents and upwelled to the surface waters. The purpose is to track the amount of Fe uptake from microorganisms used in primary production and carbon dioxide production to better quantify the global Fe fluxes. The stronger the knowledge foundation of Fe fluxes, the better scientists can understand global biogeochemical cycles and their connection to climate change.

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Improving Maternal Health in Rural Uttar Pradesh, India

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The Problem: Maternal Mortality in Uttar Pradesh

Complications related to pregnancy and childbirth are a major cause of morbidity and mortality for women worldwide, predominantly in lower and lower-middle income countries (World Health Organization, 2019). Globally, some of the most common causes of maternal death include severe bleeding, infections, high blood pressure, complications during delivery, and unsafe abortions (World Health Organization, 2019). South Asia has accounted for approximately one-fifth of maternal deaths worldwide as of 2017 (World Health Organization, 2019), with an estimated average maternal mortality ratio (MMR) of 163 deaths per 100,000 live births across the region (World Bank, n.d.). Within India specifically, the majority of maternal deaths are concentrated within seven states — one of which is Uttar Pradesh, a poorer state in Northern India where the MMR has consistently been well above the national average (Kumari et al., 2019; Meh et al., 2022). Recent research has suggested that obstetric hemorrhage — excessive bleeding during the prenatal, perinatal, or postnatal period (Tripathi & Singh, 2018) — is the most common cause of maternal death across all seven of these states, but that it represents a disproportionate proportion of deaths in Uttar Pradesh, compared to states such as Tamil Nadu and Kerala where hypertensive disorders are more prevalent (Figure 1) (Meh et al., 2022). Other major causes of maternal mortality in Uttar Pradesh and India in general (as in many lower-income countries with high MMRs) are pre-eclampsia (high blood pressure leading to convulsions if untreated [World Health Organization, 2019]), puerperal sepsis (infection of the genital tract during or soon after childbirth [Khaskheli et al., 2013]), and anemia (low red blood cell count and/or low hemoglobin concentrations [World Health Organization, n.d.]) (Ramarao et al., 2001).

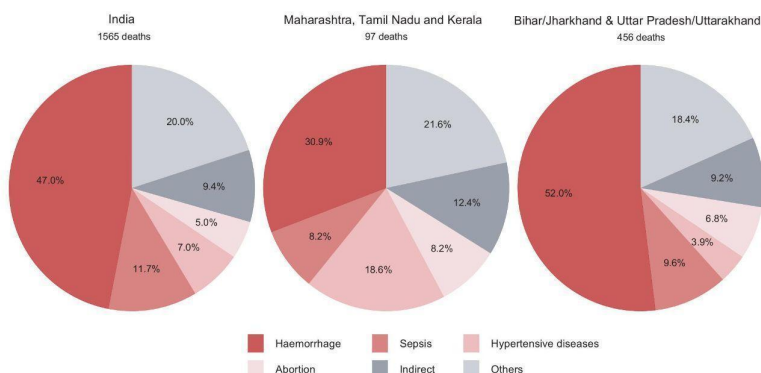


Figure 1: Causes of Maternal Death By Region

Charts representing the most common causes of maternal death in India overall; in the regions of Maharashtra, Tamil Nadu, and Kerala; and in the regions of Bihar/Jharkhand and Uttar Pradesh/Uttarakhand. Figure taken from Meh et al. (2022).

Statistics and Early Efforts

Between 2017 and 2019, the average MMR in India was reported to be 103 deaths per 100,000 births, with an MMR of 167 deaths per 100,000 births in Uttar Pradesh specifically (Office of the Registrar General, India, 2022). A major contributor to the high MMR in Uttar Pradesh has been the exceptionally high rate of unwanted pregnancies, which occur in this region at approximately twice the rate of the Indian average (Dehingia et al., 2020). It has been suggested that approximately 1 in 5 pregnancies in Uttar Pradesh are unintended (Dehingia et al., 2020). Some reasons why unintended pregnancies are associated with a particularly high risk of maternal mortality and morbidity include the increased likelihood of unsafe abortions, as well as the physiological risks associated with consecutive pregnancies that are too closely spaced (Tsui et al., 2010). Additionally, Uttar Pradesh has consistently had the highest number of home deliveries of any Indian state, with 112,123 home deliveries between April 2019 and June 2020 (Ministry of Health and Family Welfare (India) & HMIS (India), 2020). Finally, use of maternal health care services in Uttar Pradesh has been lacking among women of all castes, and is approximately three times lower in women of lower castes (Saroha et al., 2013).

Although a myriad of research throughout the 1990s examined the causes of maternal mortality in Uttar Pradesh and proposed potential solutions

(including educating husbands on maternal health [Singh et al., 1998]), few programs were actually implemented in the region due to a lack of equipment and technological expertise (Ramarao et al., 2001). However, a more generalized intervention was the Safe Motherhood Initiative, which was administered by the World Health Organization and implemented on a global scale in 1987 (Mahler, 1987). This intervention aimed to reduce maternal mortality worldwide by promoting women's health in lower income countries (Mahler, 1987). The four key strategies in the Safe Motherhood Initiative were improving access to primary health care, nutritious food, and family planning; quality of prenatal care; presence of midwives and other trained personnel at births; and access to obstetric care for women at risk of complications (Mahler, 1987). Yet, by 1999, it was noted that maternal mortality had not significantly decreased, and few national programs had been developed to prevent pregnancy-related deaths in the countries of interest (Main & Rosenfield, 1999). It has been proposed that a major limitation of the Safe Motherhood Initiative was that it primarily focused on training health care providers, without adequate focus on home births where skilled providers may not be present (Fullerton et al., 2005).

New Intervention

The Community Partnerships for Safe Motherhood (CPSM) project was a 36-month feasibility study which aimed to build on the Safe Motherhood Initiative, by increasing community knowledge and usage of life-saving techniques for mothers and infants, reducing delays in transportation to appropriate facilities in the event of life-threatening complications, and promoting family planning following births and abortions (Fullerton et al., 2005). This project was funded and developed by the U.S. Agency for International Development and IntraHealth International.

In 2001, the CPSM project was implemented in Maitha Block, a rural area in the Kanpur Dehat district of Uttar Pradesh, which encompasses over 40 villages and had a population of approximately 23,000 people at the time of the study (Fullerton et al., 2005; Prime II Project & IntraHealth, 2002). Maitha Block was selected for this study due to the high percentage of home births and the low presence of skilled birth attendants in the area. A baseline study was also conducted in the community prior to the full implementation of the CPSM project, in order to gain information about specific maternal and neonatal health issues that were prevalent in Maitha Block.

The CPSM project primarily involved a newly developed framework called the Home-Based Life Saving Skills (HBLSS), which is a participatory

approach for teaching pregnant women and their home birth team (those who are expected to be present during the birth) about the prevention and management of complications that may threaten maternal and neonatal health (Fullerton et al., 2005). Unlike the Safe Motherhood Initiative, the HBLSS framework was novel in that it was the first approach to focus on local women and other community members directly (Fullerton et al., 2005). The CPSM project also emphasized community and cultural norms in the application of the HBLSS framework, as it recognized that mothers-in-law, husbands, and sometimes siblings or friends are most likely to be part of the home birth team, and thus included a special focus on training for these individuals. Information was delivered through simple drawings depicting potential obstetric danger signs, with lists of actions to take in these situations (Figure 2); stories and roleplay; and group discussions. These teaching sessions took place in a convenient central location for the community, or occasionally in a family's home.

Kamal's Story: The Road to Life

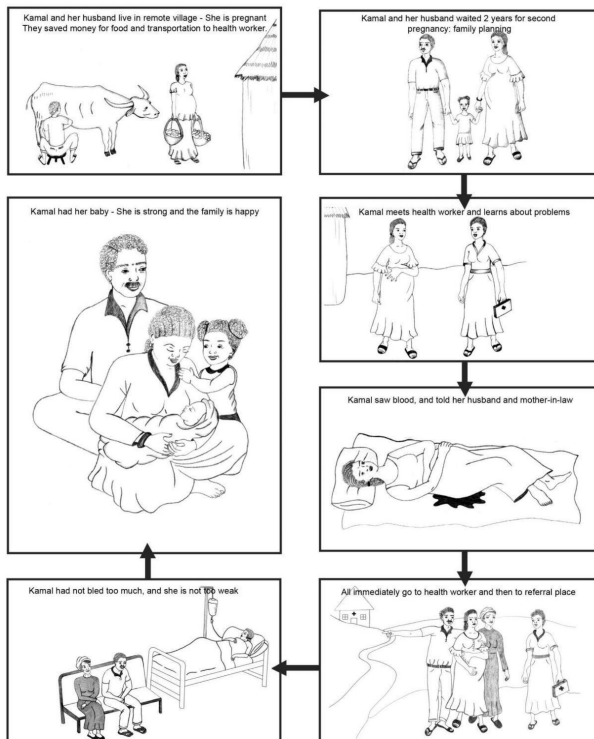


Figure 2: Sample HBLSS Card

Example of an HBLSS card using simple language and drawings to depict a prepartum danger sign (excessive bleeding) and the appropriate steps to take to prevent maternal death. Figure taken from Buffington et al. (2010).

Cost and Effectiveness

The costs and effectiveness of the CPSM project were evaluated through a combination of quantitative and qualitative measures (Fullerton et al., 2005). Quantitative measures of efficacy included assessments of information and skill retention, evaluations of knowledge of obstetric danger signs among local women, and financial audits to estimate project costs. Qualitative measures included interviews and focus group discussions with various stakeholders (e.g., community representatives).

The CPSM project enrolled 833 women and 689 home birth team members, and the total cost of the project was \$974,740 USD (Fullerton et al., 2005). Almost half of these costs were incurred during the baseline study, while the remainder were incurred during the full project implementation. Thus, the estimated costs of scaling up the CPSM project for a population of similar size came to \$441,473 USD, or \$19 per person in the community. If the scaled-up research also included only pregnant women and their home birth teams, rather than the entire community, the cost would be approximately \$290 per participant. However, the researchers emphasized that the actual costs would likely be lower if the project was implemented in regions where the HBLSS framework could be more easily adapted to local cultural and linguistic norms, with technological infrastructure in place to facilitate the project, and appropriate and effective data collection procedures already available.

Although the researchers found it difficult to directly measure the rate at which home birth teams recognized and appropriately responded to obstetric danger signs, they deemed the intervention successful based on self-reports from mothers on their success with addressing complications during delivery (Fullerton et al., 2005), as well as significant improvements in several prepartum and postpartum health practices (PRIME II Project & IntraHealth, 2002). In particular, the most commonly reported obstetric complication during the program was excessive bleeding, and 17 of the 20 women who experienced this symptom over the program's three-year duration reported that they completed at least one of the recommended treatment steps. Additionally, by four months after the program's implementation, 35% of

postpartum women were using family planning six weeks after childbirth (compared to 14% at baseline), 39% of pregnant women were taking iron supplements (compared to less than 1% at baseline), and 83% of new mothers were breastfeeding within an hour of delivery (compared to 1.9% at baseline) (PRIME II Project & IntraHealth, 2002). Although some of these statistics decreased slightly by one year after program implementation (e.g., iron supplement usage decreased to 36%, and breastfeeding within an hour of delivery decreased to 70%), they still remaining well above baseline, and other practices such as postpartum family planning actually increased significantly over time (68% by one year after implementation) (PRIME II Project & IntraHealth, 2002).

One area where the research was less successful was in encouraging transport to emergency obstetric care (EOC) facilities in the event of perinatal complications. Even though 80% of the women who experienced excessive bleeding recognized their symptoms as being “serious”, only 25% traveled to an EOC facility. A key lesson from this research was that engaging local men can improve the project’s sustainability, as they often hold more power and have higher social standings in communities like Maitha Block. Additionally, this research supported the idea that home-based interventions can be highly beneficial for promoting maternal health in regions where home births are particularly common.

Impact and Updates

Despite the optimistic predictions of Fullerton et al. (2005), it does not appear that the CPSM project has been implemented on a larger scale. Instead, one of the most widespread maternal health interventions in Uttar Pradesh has been the training of Accredited Social Health Activists (ASHAs) (Department of Health & Family Welfare, Government of U.P., n.d.). ASHAs are local women who are recruited to promote a variety of public health initiatives, including those related to pregnancy, childbirth, and family planning (Department of Health & Family Welfare, Government of U.P., n.d.). Family planning is especially important, since as of 2020, unintended pregnancies continue to be a disproportionate cause of maternal death in Uttar Pradesh compared to other Indian states (Dehingia et al., 2020). In recent years, ASHAs have also taken on roles related to COVID-19 vaccine promotion in rural communities (Sharda, 2022; Shukla, 2022).

By the 2016-2018 period, the Government of India reported that the MMR in Uttar Pradesh had fallen to 197 deaths per 100,000 live births (Dehingia et al., 2020), representing a marked decrease in maternal mortality

since the CPSM project approximately 10 years earlier. Local news agencies reported that a probable cause of this improvement was a greater focus on home deliveries in the region (Sharda, 2020), which the CPSM project had initially promoted. This is especially important considering that recent research has continued to conclude that pregnant women in rural areas of Uttar Pradesh are most likely to give birth at home, despite ongoing efforts to promote hospital births (Devi & Kaur, 2020).

Finally, one issue which continues to be significant is the disparities in maternal healthcare between castes. Dalit women (formerly referred to as “untouchables”), who are at the bottom of the Indian caste system, are less likely to use contraceptives and less likely to seek maternal health care (Saroha et al., 2008) than women who are born into upper castes. As of 2021, Dalit women still reported facing discrimination from doctors and midwives while receiving reproductive care (Chandra, 2021) — an issue which clearly must be addressed in order to address the elevated rates of maternal mortality in this region.

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Where Spectrums Meet: The Relationship Between Gender Identity and Autism

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While they may look and feel new, conversations surrounding gender identity have been going on for decades, if not centuries. *Gender dysphoria* (GD) is a diagnosis in the current version of the Diagnostic and Statistical Manual (DSM-5) as well as a generally used term to describe feelings of dissonance between one's sex assigned at birth and gender identity (Vermaat et al., 2018; Zupanič et al., 2021). This term, as well as many others related to gender identity and gender variance, is becoming more widely known and talked about within many different communities, scientific and non-scientific alike. With more people coming to understand the complexity of gender identity, more research is being done to shed light on this once-neglected topic. However, even with the increasing amount of work being done in this field, there are still some that are left behind. Many groups who are at the intersections of marginalized identities find themselves left out of gender identity research, and when they are included, other important aspects of their identities are often ignored. This is oftentimes the case with those who have disabilities, such as autism. Autism Spectrum Disorder (ASD) is a disorder characterized by neurodevelopmental differences that can lead to difficulties in communication and social functioning, repetitive behaviours, and intense, restricted interests (CDC, 2021; Cooper et al., 2018). As indicated by the name, ASD does not have one specific presentation, instead, it encompasses a wide variety of traits, abilities, and support needs (CDC, 2021). Often those with ASD feel pressured by society to present either their autism or their gender identity, due to fears of receiving more prejudice and stigma from others by being a part of and identifying with more than one marginalized group at once. However, the interaction between the two is crucial to understanding their lived experience. This paper will focus on the variations in the experience of gender in individuals with ASD, specifically touching on gender differences between individuals with and without ASD, gender differences within the ASD community, and why these differences may exist.

As it is not standard in the literature, it is important to note that in this paper, the terms AMAB (assigned male at birth) and AFAB (assigned female at birth) will be used to describe the participants who are biologically male and female, respectively. This is in opposition to gendered terms such as men, women, boys, and girls. The reason for this is so that biological sex and gender are not treated as one, but as separate parts of one's experience, since

many individuals do not find their sex congruent with their gender identity. This paper will also use the terms neurodiverse and neurodiversity, which generally refer to all neurotype variance, but more specifically the different neurotypes that go along with neurodevelopmental and learning disabilities, such as ASD and ADHD (Baumer & Frueh, 2021). In addition, this paper will also use the term neurotypical, which refers to individuals with average or common neurotypes (those not affected by the previously mentioned conditions).

Gender Differences Between Individuals with and without ASD

Since the social, cognitive, and emotional development of the brain plays a major role in both gender identity and ASD, it would not be a stretch to assume that autism, a disorder specifically targeting development, changes the way one experiences gender. In 2014, Strang et al. found that children and adolescents with ASD were almost eight times more likely to experience gender variance, or feeling like a different gender than assigned at birth, than their neurotypical peers (Strang et al., 2014). This significant finding was reinforced by a more recent study from 2018, in which adolescent participants with ASD were almost three times more likely to show gender variance than the non-autistic participants (van der Miesen et al., 2018). Adolescents and adults with ASD show a similar result as the children in previous studies, with 22% of AFAB individuals and 8% of AMAB individuals reporting feelings of gender non-conformity in one study of 8739 participants (Dewinter et al., 2017). Not only do individuals with ASD report having more feelings of gender variance than neurotypical controls, but they also report experiencing a wider range of gender identities. In a study done by George and Stokes (2018), both AFAB and AMAB participants with ASD had more diversity in their experienced gender identities than the neurotypical controls. Similarly, researchers in a study of 486 participants found that both AFAB and AMAB participants with autism were eight times more likely to choose the “other” category when reporting their gender identity (16% of autistic individuals versus 2% on non-autistic individuals), which included options such as androgynous, gender-neutral, gender-fluid, and alien (Cooper et al., 2018). AFAB individuals with autism were also more likely to self-report as feeling more masculine, while AMAB individuals with autism were more likely to self-report as feeling less masculine when compared to participants without ASD (Cooper et al., 2018)

In addition to higher rates of gender variance as well as more diversity in gender identity, individuals with ASD show differences in the rates at

which they use gender-affirming care. Gender-affirming care can include hormonal, surgical, and esthetic processes that help the individual receiving the care to feel less dissonance between their physical appearance and their gender identity (Forcier et al., 2020). As part of their study, George and Stokes (2018) measured the likelihood that participants would use hormone replacement therapy and found that participants with ASD were more likely to take hormones than non-autistic participants. Related to this, in a separate study, participants with ASD were more likely to plan or begin transitioning to their experienced gender identity compared to participants without ASD (Cooper et al., 2018).

Gender Differences Between AMAB and AFAB Individuals with ASD

The story of gender in relationship to autism does not stop here, however, as there are also measurable differences within the community. In particular, AFAB individuals with autism showed rates of gender non-conforming feelings almost three times higher than autistic AMAB individuals (Dewinter et al., 2017). This finding was corroborated by Cooper et al. (2018), who found that AFAB participants reported a misalignment with their gender and sex significantly more than AMAB participants (34% versus 11%). Similarly, researchers in a separate study found that adolescent AFAB participants were more likely to wish that they were a different gender than AMAB adolescent participants (van der Miesen et al., 2018). In the adult condition, however, the researchers found that AMAB individuals were more likely to feel that they were a different gender (van der Miesen et al., 2018). Unfortunately the underlying mechanism behind the difference between children and adults is not yet known, and van der Miesen et al. (2018) suggest that more research into this area is needed to better understand this phenomenon. In the study done by Cooper et al. (2018), AFAB individuals showed the lowest rates of gender self-esteem (positive feelings about their gender) when compared to all other participant groups. When it comes to transitioning, there are also measured differences between AFAB and AMAB individuals with ASD. Cooper et al. (2018) not only showed that the rates of planning or going through with transitioning were higher in individuals with ASD, but they also showed that among those with autism, AFAB individuals were more likely to plan or begin transitioning.

Reasons for Gender Differences in Individuals with ASD

When looking for reasons as to why gender differences in individuals with ASD may come about, there are a few common theories. De Vries et al.

(2010) postulated that GD and interests that are incongruent with an individual's assigned sex may not be due to gender variance. Instead, they argued that individuals with autism may incorrectly interpret social troubles as GD (de Vries et al., 2010). They also posited that in AMAB individuals, interests in things that were more typically feminine such as long hair, glitter, or soft fabrics may be due to their sensory qualities rather than their association with femininity (de Vries et al., 2010). Another potential reason for gender differences in individuals with ASD is the Extreme Male Brain (EMB) hypothesis. The EMB hypothesis theorizes that one possible reason for autism is increased levels of fetal testosterone (van der Miesen et al., 2017). These high levels of testosterone are said to cause more extreme versions of male-aligned behaviours, which in the EMB hypothesis are said to be the behaviours seen in stereotypic presentations of ASD (van der Miesen et al., 2017). High levels of fetal testosterone in AFAB individuals are also posited to cause higher rates of GD, which would be congruent with higher rates of masculinity found in AFAB individuals with autism (Cooper et al., 2018; George & Stokes, 2018; van der Miesen et al., 2017). This theory, however, could not explain the higher rates of GD, gender variance, and gender diversity in AMAB individuals with autism. Finally, Dewinter et al. (2017) hypothesized that gender differences in individuals with ASD cannot be due to one cause and advocated for a biopsychosocial model. This view included biological differences but also emphasized that a large contributing factor may be the differences in how individuals with and without ASD interpret gender and gender roles (Dewinter et al., 2017).

Conclusion

Gender identity can be a complex and variable part of anyone's identity, but when neurodiversity is introduced into the equation, gender only becomes more intricate. While the exact relationship between ASD and gender identity is still unknown, it is apparent that both factors are heavily influenced by each other. Individuals with ASD not only show differences in gender identity when compared to those without ASD, but there are also stark differences within the community. While there is always more work to be done, research into this area shows how much variety there truly is in how people experience gender, and hopefully will provide new insights and understanding into this complex topic.

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A potential treatment for Depression in TPH2-R439 Mouse Models: Serotonin and Slow Release 5-HTP

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Summary

Depression is the result of several biopsychosocial factors with a heightened dependency on the gut-brain axis (Naseribafrouei et al., 2014). Previous research on depression has observed low tryptophan levels, which is a major derivative of serotonin in the human body (Coppen et al., 1988). Studies exploring the role of serotonin in inducing depression have often resorted to decreasing the availability of this precursor to elevate depression-like behavior in mice patients (Meltzer, 1990). Tryptophan metabolites have a significant effect on regulating gut microbiota that are primarily found in the gastrointestinal tract along with the central nervous system (Gao et al., 2018). Thus, dysregulation of the gut microbiota can lead to neuropsychiatric disorders. The original paper strived to further investigate this relationship by observing restoration of depressive symptoms in analogous TPH2-R439H mice when provided with diets rich in 5-HT (Israelyan et al., 2019). They evaluated a treatment which consisted of delivering 5-HTP as slow-release (SR) which was successful in correcting abnormalities like enteric neuronal development, GI motility and enteric mucosal growth. Using immunostaining techniques, the fluorescence intensity of serotonergic neurons in the ENS was observed, suggesting significantly less fluorescence in TPH2-R439H mice. The researchers coined this observation to polymorphisms in mice that depletes 5-HT causing a reduction in the number of neurons and neurites in the ENS. Ca^{2+} imaging was utilized to depict that tryptamine-induced neuronal firing evokes the release of endogenous 5-HT in significantly lower levels in TPH2-R439H mice.

This review will concentrate on how altered tryptophan metabolism influences the brain function in relation to gut microbiota regulating this pathway, a reverse perspective on how defects in neuron production of 5-HT can result in internal dysfunction regarding the gut microbiome.

Background & Introduction

The gut-brain axis is a biochemical, bidirectional signaling pathway between the gut microbiota and the central nervous system (Zhao et al., 2018).

The gut microbiome consists of an ecosystem of a plethora of bacteria, viruses, fungi, and other microorganisms. Due to its overlap with the nervous system, it is hypothesized to have a significant effect on cognitive functioning and mood, via the production and release of neurotransmitters and their precursors. The extant literature indicates that communication in the gut microbiota is mediated by vagal and spinal afferent pathways and neural connections by chemical messengers (Bonaz et al., 2018). It is also involved in the hypothalamic-pituitary-adrenal axis (HPA) where dysregulation and imbalance in the release of cortisol and inflammatory mediators has major implications in mood regulation and emotional processing (Silverman et al., 2013). Hence, the gut-brain axis may have significant relevance to anxiety and depression.

A worldwide conducted survey reports that 45.7% of cases with major depressive disorder also had a diagnosis of one or more anxiety disorder (Kalin, 2020). Similarly, 67% of patients with generalized anxiety disorder had a comorbid unipolar depressive disorder (Zbozinek et. al, 2012). A possible speculation for these psychiatric disorders to coexist with one another is their shared neurological vulnerabilities and underlying risk factors. It was found that rodents that possess anxiety and depression-like symptoms showed alterations in microbial and bacterial aggregates. The gut microbiome has a diverse range of microorganisms whose varying proportions contribute to the implications of either depression or anxiety. External factors like stress, for instance, can modify the HPA-axis causing a direct effect on the gut microbiota abundance. A study supported this theory where it was discovered that germ-free (GF) mice exhibited an underdeveloped immune system because of unhabituated microbiota compared to house-specific pathogen-free mice (SPF) (Manca et al., 2019). This finding drove neuroscientists to further investigate the link between the gut microbiota and central nervous function.

The pathophysiology of depression revolves around moderate levels of serotonin being produced by neurons and circulated through the body (Saveanu et al., 2011). When rat models of depressive behavior were observed in a modified forced swim test, the results obtained depicted a significant decrease in basal extracellular dopamine in the nucleus accumbens (Nakamura et al., 2007). A lower level of serotonin release causes anhedonia and lack of motivation: symptoms of depressive behavior.

In the original paper, Israelyan et al. (2019), predicted that a diet rich in 5-HTP slow release (SR) successfully restores levels of 5-HT in depressive transgenic mice models (TPH2-R439H). Subsequently, they performed immunocytochemistry to quantify total enteric, serotonergic and 5-HT dependent neurons along with calcium imaging techniques to observe

responses to tryptamine-evoked release of 5-HT. Total gastrointestinal motility transit, gastric emptying, small intestinal transit and propulsive colorectal motility were evaluated in live mice models. It was evident that reduced release of 5-HT in enteric neurons caused defects in neuronal development and GI motility, which returned to normal following administration of 5-HTP SR in the transgenic TPH2-R439H mice.

Major Results

TPH2-R439H mice show decreased GI transit with deficits in peristaltic reflexes GI motility was determined through measuring total GI transit time (TGIT), propulsive colorectal motility, gastric emptying, and small intestinal transit time *in vivo*. The differences in the measured time were non-specific and significantly increased in TPH2 polymorphic mice for TGIT and colonic motility but not for gastric emptying and small intestinal transit time.

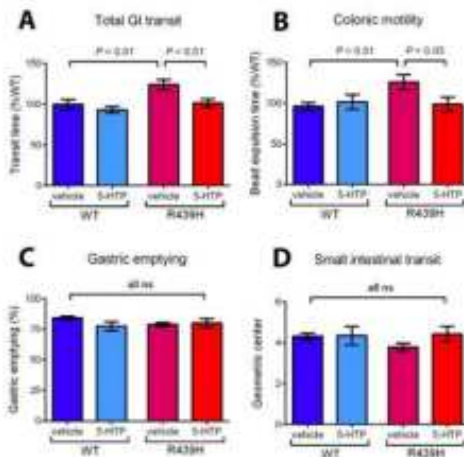


Figure 1. Bar graphs representing measured GI motility through (A) Total GI transit, (B) Colonic motility, (C) Gastric emptying, (D) Small intestinal transit. Carmine red was orally gavaged and TGIT was measured as the interval between gavage and carmine red appearance in. Time required to expel the bead inserted into the colon was the estimate of colorectal propulsion. C and D were calculated using established formulae.

Restoration of ENS development following 5-HTP SR in TPH2-R439H mice

5-HTP concentrations were seen to ameliorate significantly with slow release 5-HTP mouse chow in the plasma and CNS. In addition, to investigate

a similar effect when orally transmitted, mice were given 1g/kg/day of 5-HTP SR in the form of chow for 4 weeks and its effects in reversing ENS abnormalities and functional deficits were observed. The administration of 5-HTP SR successfully increased the number of total GABA and TH expressing neurons in specific areas in adult TPH2-R439H mice, reaching significantly close numbers to those of the control condition mice. It is important to note that when WT mice were administered with 5-HTP SR, no significant difference in the number of these neurons was displayed. Gastrointestinal motility, specifically bowel movement, is one of the major functional defects of the ENS system during adulthood in the absence of serotonin derivatives. The results signify that 5-HTP SR was able to rescue *in vivo* TGIT (A) and colonic motility (B) but not gastric emptying (C) and small intestinal transit (D).

Decrease in intestinal epithelial growth in TPH2-R439H mice is normalized after 5-HTP SR administration

Villus height and crypt depth are properties of healthy epithelial growth and have been observed to be found in significantly lower numbers in TPH2KO mice. Moreover, these factors were measured in TPH2-R439H mice with and without the administration of 5-HTP SR. It was discovered that both these properties were significantly greater in WT mice and successfully increased in 5-HTP SR treated TPH2-R439H mice. Enterochromaffin (EC) and enteroendocrine (EE) cells are found in the intestine and can be used to measure normal epithelial growth. Both these cells showed significantly lower levels in TPH2-R439H mice as compared to WT mice. Only EC cells seemed to be affected with 5-HTP SR administration, significantly increasing in TPH2-R439H mice. EE as well as EC cells remain unaffected following 5-HTP SR treatment suggesting that development of enteroendocrine lineages response to specific neuronal drives.

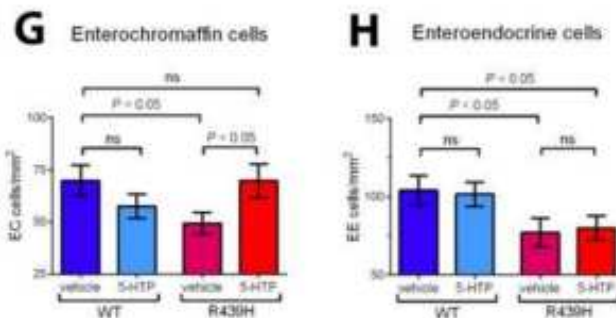


Figure 2. Changes in enterochromaffin cell (G) and enteroendocrine cell (H) numbers as compared to WT and TPH2-R439H mice measured in levels of cells/villus area (mm²).

Conclusion/Discussion

Israelyan et al. (2019) illustrated that administration of 5-HT slow release through feeding chow in transgenic mice models with depressive-like behavior can successfully restore disrupted levels of serotonin in the central nervous system. In addition, the administration reduced behaviors associated with depression, providing findings that may have implications for future researchers and therapeutic targets. The paper purports a direct effect of manipulating diet in altering behavior that is linked to neurotransmitter levels and release in the brain, implying the importance of gut health on psychiatric disorders. The researchers induced a tryptophan hydroxylase-2 (TPH2) polymorphism in transgenic mice to assess abnormalities in ENS structure and function caused by TPH2 hypofunction which can be studied by analyzing the serotonin synthesis pathway; further discussed in this section.

To support the hypothesis that 5-HT promotes neurogenesis, it can be inferred that 5-HT acts as a growth factor in the ENS. While investigating a cure for atherosclerosis, a study observed that release of 5-HT stored in blood platelets interacted with vascular endothelial cells to relax smooth muscle cells. 5-HT interacts with G coupled proteins to mimic the behavior of typical growth factors (eg: BDNF) to induce cell proliferation. Microbial metabolites, like short-chain fatty acids (SCFAs) play a role in activating immune cells through GPCR-dependent mechanisms to differentiate Tregs that has a suppressive function. On the contrary, long-chain fatty acids (LCFAs) act in a way to ameliorate differentiation and proliferation of Th1 and Th17 cells, mRNA expression of pro-inflammatory factors such as TNF- α , IFN- γ , and Csf2. The transmission of these factors from the gut to the brain leads to a severe phenotype (Gao et al 2018).

The gut microbiota makes up to 90% of the body's serotonin. Considerably so, the microbiota greatly impacts the regulation of 5-HT. Although the mechanism of metabolizing gut-derived 5-HT remains unknown, a possible intervention refers to isoenzymes of tryptophan hydroxylase (TPH1 and TPH2) that mediate non-neuronal and neuronal biosynthesis respectively. This enzyme is expressed following stimulation by microbiota metabolites, such as SCFAs. Based on this finding, the original paper supplied food with high levels of SCFAs to mice with TPH2 polymorphism to investigate the effect of 5-HT slow release in normalizing

ENS development. The two isoenzymes – TPH1 and TPH2 serve the same function however, their difference in localization contributes to their difference in enzymatic activity. TPH1 is highly expressed in the pineal gland and the periphery whereas TPH2, the dominant enzyme of the two, is abundant in the brain (Gao et al., 2018). TPH2 has been found to have greater implications to psychiatric disorders and neurodevelopmental abnormalities.

Critical Analysis

Israelyan et al. (2019), purports that reduced release of 5-HT from enteric neurons leads to defects in GI motility, linking depressive-behavior to constipation. Preliminary studies have reported comorbidity between depression and gastrointestinal disorders such as irritable bowel syndrome (IBS). A significant observation of IBS is the onset associated with change in frequency of stool and/or change in the appearance of stool (McLean et al., 2006). With the help of carmine red dye administration, this appearance in stool could be detected in assessment of colonic motility and colorectal propulsion. A major point to be emphasized is the use of transgenic mice to induce depression in the mice models. It can be ethically wrong to instigate a psychiatric disorder like depression even in animal models.

While the experiment served its purpose in testing depressive mice models using TPH2 polymorphism, the sample of mice being tested belonged to the same strain which made it more difficult for the results to be generalized. This effect was monitored by including mice of both genders (male and female). Furthermore, live mice were used to measure TGIT through observational methods which is efficient to draw conclusions about behavioral mechanisms in humans due to their similarities in genome. The data showed potential for therapeutic interventions for disorders that directly affect the brain as well as the gut. The proposed 5-HTP SR strategy can be encouraged for depressive animal models, however, the human gut microbiome is a lot more complex. Thus, researchers need to settle for observational techniques that lead to correlational results rather than inferential results, as it is difficult to generalize this study and apply it to real life practice. Culturing specific bacteria to investigate their role in the presence of 5-HTP SR administration can be a difficult process, requiring time and effort. Past research has made it comparatively less complicated as specific abundance of bacteria have been found to be present in specific neurodegenerative disease. An example of one such researched bacteria is *A. muciniphila* whose presence was significantly different in control and diseased patients and can be detected through fecal matter (Cani, 2018). This

species of bacteria is termed as a *Bacteroidales*, which are known to be overrepresented in association with depression (Naseribafrouei et al. 2014). Thus, using this information the authors can curate experiments that allow them to identify the presence of this bacteria in faecal matter, confirming the prevalence of depression in the polymorphic mice models.

Future Directions

There are still a lot of unanswered questions about the link between gut microbiota and brain related disorders. The paper by Israelyan et al. (2019), made a substantial effort to explain the causal link shared by these two systems in reverse by administering 5-HT SR to a depressive mice model. Most experiments studying this relationship implement a fecal microbiota transplant where feces of a diseased patient are infused into the GI tract of a healthy patient. To cross check the results obtained from the discussed study, the researchers could try and reverse the effects of depression using FMT methods. TPH2 polymorphic mice would show a reduction in SCFA after being infused with healthy gut microbiota. Doing this would also help minimize the ethical and legal issues with creating a depressive mice model.

The researchers can carry out a behavioral test model after inducing the TPH2 polymorphism. For instance, the forced swim test (Can et al., 2012), sucrose preference test (Ying Liu et al., 2018) or tail suspension test (Can et al., 2012) could be carried out before conducting the experiment as an added observation to confirm the presence of depression based on the transgenic mice behaviors. Moreover, the pathways of the two isoforms of enzyme tryptophan hydroxylase (TPH1 and TPH2) can be studied further to analyze their contribution to 5-HT synthesis and whether they have different effects on gut health and even more so, on psychiatric disorders. As this study used mice as participants, it is important for the researchers to be able to extend their findings to humans to create a successful treatment for depression. The human TPH1 gene has been proven to be expressed significantly higher than the TPH2 gene in the amygdala and hippocampus (Sugden et al., 2009). The serotonergic neuron distribution between mice and humans are varied and thus, their effects may affect the system differently.

Altered levels of serotonin has major implications on cognitive illnesses like schizophrenia (Patel et al., 2014). Schizophrenia is characteristic of changes in mood, social functioning, and psychosis. The pathophysiology of this disorder is due to excess levels of neurotransmitters released such as dopamine and serotonin. As this study supplies the mice models with slow release 5-HT, there can be an adverse effect of imbalance of serotonin in the

brain which may lead to minor schizophrenic symptoms. To prevent a long-term effect of this supplementation, the researchers must provide treatment through injectable antipsychotic drugs (Patel et al., 2014).

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