

**Give me a Patch and I will Create a Market:
Institutional Disparities between Tic Disorders and ADHD in China
during the Xi era**

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Abstract: This thesis examines the role of the state in the pharmaceuticalization of Tic Disorders (TD) and ADHD in China. Empirically, it investigates the factors that led to institutional disparities in the professional associations for TD and ADHD, two medical conditions that often coexist, during the Xi Jinping era. It asks why a national-scale, hierarchical professional association has formed around TD, a condition less diagnosed and recognized, while ADHD remains a decentralized organizational structure to date. Adopting a mixed-methods approach, this research draws on data from interviews with fifteen pediatricians, ethnographic observations at six medical conferences, and extensive digital archives, including 40 hours of conference recordings, publications in 20 medical journals and newspapers, China's healthcare and pharmaceutical policies, and sales statistics for TD and ADHD drugs in China's market. It argues that the contested biomedical knowledge of TD created a space for a robust network of expertise to coalesce around tics and its biopharmaceutical medication, LittlePatch. By contrast, the well-established biomedical knowledge of ADHD precluded the space to assemble a similarly centralized network of expertise around ADHD and its medications. Within these expertise networks, state actors played a central role in shaping the structure of professional associations for managing these medical conditions. This research enriches our understanding of the state's multifaceted roles in driving medicalization processes.

Introduction

The past half-century has witnessed a significant social transformation in the Anglophone world marked by the increasing medicalization of society, where issues of non-medical have become primarily defined as medical problems (Conrad, 2007; Zola, 1972). This thesis aims to broaden our understanding of medicalization by examining the role of the state in these dynamics.

This research conducts a comparative analysis of the pharmaceuticalization of ADHD and Tic Disorders (TD) in China. The central puzzle concerns the institutional disparities in the professional associations for these conditions of high co-occurrence during the Xi Jinping era. Why has a national-scale, hierarchical professional association formed around TD, a condition less diagnosed and recognized, while ADHD remains a decentralized organizational structure to date?

I argue that, the contested biomedical knowledge of TD opened up a space for a robust network of expertise (Eyal, 2013) to coalesce around tics and its biopharmaceutical medication, LittlePatch. By contrast, the well-established biomedical knowledge of ADHD precluded the space to assemble a similarly centralized network of expertise around ADHD along with its medications. Within these expertise networks, state actors played a central role in shaping the structure of professional associations for managing these medical conditions. Specifically, during the Xi era, the Chinese state economized the medicalization and pharmaceuticalization of neurodevelopmental disorders in a techno-nationalistic way. Pediatric neurologists and Sinopharm-RedFlag capitalized on such political opportunities to build a centralized professional association around tics and LittlePatch.

The background section will lay out the organizational structures for both diagnoses in China during the Xi era, enriched with ethnographic details to highlight their institutional disparities. The empirical section is divided into two parts. The first part will examine how different states of

biomedical knowledge for TD and ADHD shaped distinct networks of expertise for each diagnosis before the Xi era. The second part will demonstrate how state actors played a central role in shaping different structures of professional associations for TD and ADHD during the Xi era. The concluding section will discuss the implications of these institutional disparities for understanding the multifaceted roles of the state in driving medicalization and pharmaceuticalization. Finally, this research will reveal how such variations in state involvement affect the behaviors and daily lives of societal actors within this field.

Literature Review

The literature on medicalization has traditionally focused on meso-level institutional analysis, while this focus has left the role of state power in medicalization understudied within the field of medical sociology. Current scholarship recognizes a dynamic shift over time in the institutions driving medicalization (Conrad, 2005), from medical professionals (Friedson, 1970; Illich, 1975) to interest groups (Conrad, 1992; Epstein, 1996), biotechnology advancements (Clarke, et al., 2003; Rose, 2001), managed care (Scott, 2000; Starr, 1982), and notably towards pharmaceutical corporations (Abraham, 2010; Bell and Figert, 2012; Dumit, 2012). While these shifts in the social landscape have redirected analytical focus towards different institutional actors, they do not intrinsically widen the analytical scope of medicalization theory. How the state, which shapes the fields for these societal forces, plays its role in medicalization processes entails further investigation. However, this is not to say that the influence of the state is underexplored in medical sociology (Quadagno, 2004; Scull, 2015); rather, sociological studies on how state power interacts with evolving medicalization processes require a more systematic integration (Foucault, 1973; Foucault,

1975; Timmermans and Berg, 2010).

The rising prominence of pharmaceutical corporations as one of the powerful “new engines of medicalization” (Conrad, 2005)—a societal force that cannot be disentangled from the support of state agencies (Carpenter, 2014)—underscores the necessity of more research focusing on the relationships between state power and pharmaceutical capital. This endeavor has led to the introduction of the term “pharmaceuticalization,” defined as “the process by which social, behavioral or bodily conditions are treated, or deemed to be in need of treatment/intervention, with pharmaceuticals by doctors, patients, or both (Abraham, 2010: 290).” While existing research on pharmaceuticalization does touch upon state engagement, it often portrays the state merely as an entity promoting deregulatory ideologies or policies that lower the barriers for pharmaceutical companies’ products to enter the market (Abraham, 2012). Detailed studies on state agencies like the FDA reveal a far more complex and interventionist role of the American state in the pharmaceutical sector (Carpenter, 2014; Prasad, 2012), yet such nuanced analysis of state involvement has not been fully integrated into the broader discourse on medicalization and pharmaceuticalization research.

Based on this, a related critique regarding existing research on pharmaceuticalization suggests its potentially biased understanding of the roles of state power. This is because most of the existing research sources data primarily from developed countries endowed with advanced biotechnology, widespread biomedical practices, and mature biomedical regulation (Clarke et al., 2003; Conrad, 2007; Rose, 2001). This perspective risks overlooking the varying roles that states assume in the healthcare and pharmaceutical domains globally (Greene, 2011; Morgan and Orloff, 2017), particularly in the Global South, where the contexts and dynamics of pharmaceuticalization can

vastly differ (Ecks, 2008; Petryna, 2009; Rajan, 2006; Rajan, 2017). Pharmaceuticals may serve both as tools for biomedical innovation and as symbols of nationalistic achievement for inter-state rivalries. Such observations call for a more nuanced examination of motivations for pharmaceuticalization and symbolic implications across different national positionalities.

Given this, China offers a pivotal landscape for examining the multifaceted roles of state power in medicalization and pharmaceuticalization for its status as a developing country. Despite grappling with resource scarcity and underdevelopment in many healthcare sectors, China possesses a high state capacity to enforce policies (Duckett, 2011; Greenhalgh, 2008; Huang 2014; Kleinman, 2007). The trend that the state has overtly increased its influence on societal actors since the Xi era positions contemporary China as an ideal case to study how state power shapes the processes of medicalization and pharmaceuticalization.

Seeking to dissolve the perceived boundary between the institutional interactions at the meso level and the more abstract dimension of state involvements at the macro level, this research utilizes the theoretical framework of the sociology of expertise (Eyal, 2013). Drawing upon Actor-Network Theory (Callon, 1986; Latour, 1987), the sociology of expertise adopts a relational-structural approach (Emirbayer 1997; Eyal, 2010) to traverse these meso-macro boundaries to elucidate the subtle yet pervasive influence of the Chinese state. In this article, I refer to Eyal's (2013) definition of "expertise" as "a network linking together agents, devices, concepts, and institutional and spatial arrangements." This theoretical lens is applied to dissect the institutional disparities in professional associations for TD and ADHD in China during the Xi era. The institutional disparities serve as a tangible manifestation to reveal the "many hands" of the Chinese state in medicalization and pharmaceuticalization (Morgan and Orloff, 2017).

Background

In the first national-scale psychiatric epidemiological survey of children and adolescents in China, four mental disorders emerged as the most common: ADHD (6.4%), Anxiety Disorders (4.7%), Depressive Disorders (3.0%), and TD (2.5%) (Li et al., 2022). Intriguingly, national professional associations under the affiliation of the Chinese Medical Association were established around Anxiety, Depression, and TD, but none for ADHD.

In this study, I selected the specific case of TD and ADHD to compare their institutional disparities because the frequent co-occurrence of these two conditions attracted attention from state agencies to intervene. In the *Child Health Literacy Promotion Plan* launched by the China Population Communication Center (CPCC) in 2021,¹ both diagnoses were identified as key neurodevelopmental disorders with promising prognoses.² To note, more than half of those affected by TD can be diagnosed with ADHD (Kumar, Trescher, and Byler, 2016). The state agency aimed to optimize their treatment outcomes through early intervention. However, there was a key difference between TD and ADHD: while a national-scale association comprising foremost pediatric neurologists at public hospitals and a state-invested pharmaceutical corporation surrounds TD, no similar centralized institution exists for ADHD.

¹ This plan was directed by the Maternal and Child Health Department of the China National Health Commission, launched by the China Population Communication Center, and supported by the National Center for Women and Children's Health, China CDC.

² The China Population Communication Center (CPCC) was a public institution directly affiliated with the China National Health Commission (NHC). The CPCC later evolved into the National Center for Mental Health, a national-level technical institution newly set up under the China NHC with a focus on mental health in 2021.

Compared to ADHD, TD is less diagnosed and less publicly recognized, yet it successfully rallied extensive societal actors to assemble a nationwide hierarchical consortium, the Tic Disorders Association of China Child Neurology Society (TDAC). Operating as a non-profit academic entity centered around a specific medical diagnosis, TDAC is affiliated with the Chinese Society of Pediatrics, a specialty society of the Chinese Medical Association. This affiliation positions TDAC as a bridge between the government and medical professionals. TDAC has a leading committee, which comprises three senior consultants, one head, eight deputy leaders, and a secretary. It expands at a fast pace. Since its foundation in September 2018, TDAC has rapidly set up nineteen provincial branches across the country, a particularly impressive achievement given the challenges that COVID-19 has posed.³ TDAC also holds a homogenous component of pediatric neurologists. Ten of the thirteen members of the leading committee are renowned pediatric neurologists. Each provincial branch is headed by a physician appointed by the leading committee to advance TDAC's initiatives. Remarkably, all nineteen provincial leaders are pediatric neurologists. The financial backing of TDAC is provided by China National Pharmaceutical Group Shanxi Rfl Pharmaceutical Co., Ltd. (RedFlag).⁴ After its acquisition by Sinopharm in 2012, RedFlag has become a state-invested corporation and received increased investment.⁵

By contrast, the organizational structure of ADHD appears much more dispersed. As of now, there is no single national-scale association comparable to TDAC for ADHD. What we see instead is a multitude of decentralized organizations. In both Shaanxi province and the region of Northeast-

³ China is divided into 34 province-level administrative divisions.

⁴ Rfl is the abbreviation for “Rui’fu’lai” (瑞福莱) in Chinese, synonymous with “Red Flag” in meaning.

⁵ Sinopharm is a colossal state-controlled pharmaceutical conglomerate overseen by the State-owned Assets Supervision and Administration Commission of the State Council.

Mongolia, we can find provincial ADHD associations, while in Shanghai, we can find alliances among local medical institutions. One association worth noting is the Multi-disciplinary Alliance for the Prevention and Treatment of TD and ADHD, which has expanded its reach to over eight provinces in the past three years. However, even this entity's designation suggests a subtle deviation: it is termed an "alliance" rather than an "association," and its focus tilts more towards TD than ADHD. Additionally, its professional makeup is much more eclectic, encompassing pediatric psychiatrists, Traditional Chinese Medicine (TCM) pediatricians, pediatric neurologists, and pediatric healthcare physicians. It is also noteworthy that its funding comes from a company that produces TCM. In all, no nationwide association exists for ADHD.

When I interviewed several leading experts in the field of TD in China, including core committee members of TDAC and prominent chief physicians across several provinces, they unanimously attributed Dr. Zhisheng Liu's leadership as the primary reason for TDAC's inception. Dr. Liu, who is head of TDAC and serves as the Deputy Dean of Wuhan Children's Hospital, was consistently lauded by other leading committee members for his unwavering dedication, even to the minutest organizational details, to running TDAC. These medical professionals highlighted that in the Chinese context, the successful establishment of a national-scale association like TDAC fundamentally hinged on the presence of a stalwart leader like Dr. Liu, who was ready to spearhead initiatives and bring visions to fruition.

While Dr. Liu's leadership was indispensable to TDAC's establishment, his prestige is the end rather than the beginning of the association. Therefore, it could be insufficient to attribute the inception of TDAC solely to Dr. Liu's influence, a status he attained only after the establishment of the association. An intriguing observation arose when I asked those elite physicians why there had

not been a counterpart association for ADHD in the country. Given the broader base of practitioners, ampler research, and more clinical undertakings associated with ADHD, it baffled me to imagine that no ambitious individual had aspired to establish a national institution akin to TDAC. Yet, their reactions ranged from visible bewilderment at the institutional difference to subtle sidestepping from my question, suggesting I direct such inquiries to ADHD specialists.

A particularly notable moment happened at the 2023 Annual Meeting of Pediatricians when I seized an opportunity to engage Dr. Liu in conversation about his motivations for establishing TDAC and his viewpoints on the ever-increasing focus on TD. Dr. Liu, an energetic man who, despite the COVID-19 pandemic, attended the inauguration of local branches across nineteen provinces in person within just three years since TDAC's foundation, displayed a striking humility. Amid his hectic schedule, Dr. Liu took a moment to answer my inquiries by the elevator. Yet, in his unassuming manner, Dr. Liu first praised the contributions and the work done by other professionals in the field of ADHD and other neuro-developmental disorders. He also downplayed any distinctiveness of TDAC and made no efforts to highlight his personal achievements from others. In that encounter, Dr. Liu's response appeared to diverge from what I had learned from all other leading figures in the TD field.

Dr. Liu's humility could be interpreted in several ways. His modest demeanor may suggest that expertise networks involved so many key actors that he preferred not to draw undue attention to himself. Alternatively, he could be employing strategic discretion, as the formation of TDAC might have involved confidential dealings with Sinopharm-Redflag, details of which he preferred not to disclose publicly to avoid casting his relationships with pharmaceutical corporations in a problematic light. These are merely hypothetical explanations for the seemingly contradictory

interactions observed between Dr. Liu and other leading pediatricians in the field. Such complex interactions intensified my interest in the central puzzle of this research: the institutional disparities between professional associations for TD and ADHD in China during the Xi era. Why does a centralized professional association revolve around TD and not ADHD in China to date?

Methods and Data

My empirical analysis draws on a combination of interview, ethnographic, and archival data.

From March to July 2023, I conducted in-depth, semi-structured interviews with fifteen pediatricians, most of whom are affiliated members of TDAC, spanning across four provinces. Interviews ranged from 20 minutes to three hours, with an average duration of 1.5 hours. Questions included how pediatricians understand TD and ADHD, how they diagnose and treat both conditions in daily practice, and how they joined TDAC. I tailored interview outlines to suit the diverse backgrounds of pediatricians, considering their different positions, departments, and geographic locations. I transcribed the interviews verbatim in Chinese, coded the transcripts based on recurring themes, and translated relevant portions into English. A detailed overview of the interviewees is provided in Table 1 of the appendix.

The selection of interviewees' provinces was strategic, as they all host key members of TDAC's leadership, which consists of thirteen renowned pediatricians from seven provinces. I successfully engaged with four of TDAC's leading committee members for information, including the head of the association. I chose Shanghai as the primary location for interviews, as it is a hub where ADHD work has thrived the most within the country. This allowed for robust comparative insights into institutional disparities between ADHD and TD. The ten pediatricians interviewed in

Shanghai were all affiliated with the city's top five public hospitals specializing in pediatric medicine. As my sample covered all positions of professionals and spanned different departments in pediatrics, the data gathered offers an exhaustive perspective on TD in Shanghai. Additionally, interviews with pediatricians not affiliated with TDAC are also crucial because they provided valuable perspectives on these institutional disparities as outsiders.

In post-COVID China, securing access to interview medical professionals presents many challenges.⁶ Without direct ties to medical professionals, I had to pivot to an indirect referral approach, utilizing every personal relationship at my disposal rather than the traditional snowballing method to connect with pediatricians.⁷ This entailed not primarily relying on physicians I had already interviewed to introduce me to their peers, but turning to my key contacts to harness their networks and connect with more pediatricians.⁸ Besides, I managed to arrange interviews and informal talks with some pediatricians via acquaintances made at medical conferences.

I carried out ethnographic observations at four medical conferences and two pharmaceutical forums between June and July 2023. During each event, I recorded, transcribed, and took notes on relevant lectures. I used the breaks between sessions to engage in informal conversations with pertinent individuals, exchanging contact information, and exploring possibilities for future collaboration. Of the events I attended, two were primarily comprised of medical professionals, two

⁶ Challenges I encountered during this research include heightened political sensitivity surrounding medical topics, the recent Anti-Corruption movement in the medical field (starting from July 2023), mistrust aimed at overseas researchers on their positionalities, and inherent hierarchies within healthcare institutions.

⁷ "Direct ties" refer to family ties to physicians. In my current research experience, these relationships can be pivotal for establishing trustworthy connections as an independent researcher, particularly when not being a fellow affiliated with a (typically domestic) research team.

⁸ These key contacts include my close friend's relative holding a chief position in a hospital and faculties as well as senior officials at Fudan University.

were supervised by the China National Health Commission with the presence of high-ranking government officials, and the remaining two forums were organized by pharmaceutical corporations.

A detailed overview of my ethnographic observations is provided in Table 2 of the appendix.

Two conferences are noteworthy: the 2023 Annual Meeting of Pediatricians and the 2023 China Brain Health Conference. The former was held by the Chinese Medical Doctors Association, one of China's most prominent medical associations. It allowed me to secure interviews and informal conversations with three TDAC leading committee members, including its head, during the Pediatric Neurology venue. The latter was China's inaugural event focusing on brain health. It provided valuable insights into how leading Chinese physicians understand neuro-developmental and psycho-mental issues from a cerebral perspective.

To infuse my analysis with a historical perspective, I scrutinized extensive digital archives.

I analyzed audio-visual and textual records from TDAC's digital archives, accessible through its official websites. This encompassed 40 hours of recordings from four national academic conferences and eight regional meetings from 2020 and 2022. I analyzed these contents based on the transcripts. Additionally, I scrutinized TDAC's organizational bylaws, clinical consensus statements, and a complete collection of news releases from its public channels. This work provides a holistic view of the association's initiatives.

I reviewed medical literature from a total of 20 medical journals and newspapers, comprising eight Chinese and twelve English-language publications. This selection strategically focused on key scholarly articles by eminent TD and ADHD specialists from Chinese medical journals. Additionally, I looked into books published by TDAC leaders and public media interviews with Chinese leading pediatricians to gain deeper insights.

To understand the broader healthcare context, I examined policies related to chronic illnesses, maternal and child health, and national health-economic plans issued since 2013 by China's National Health Commission and the State Council.

To thoroughly understand the pharmaceutical landscape, I accessed and analyzed market data regarding TD and ADHD medications from PharmaBI National's private databases.⁹ I also sourced financial reports of corporations manufacturing these drugs from Qichacha.¹⁰ Furthermore, I compiled an array of news, promotional materials, and marketing articles from RedFlag's WeChat public accounts and their official websites. This multifaceted approach provided a comprehensive view of the market dynamics and promotional strategies in the pharmaceutical sector for TD and ADHD.

Findings

My explanation for the institutional disparities in professional associations for TD and ADHD in China during the Xi era is that, the contested biomedical knowledge of TD opened up a space for a robust network of expertise to coalesce around tics and its biopharmaceutical medication, LittlePatch. By contrast, the "well-established" biomedical knowledge of ADHD precluded the formation of a similarly centralized network of expertise around ADHD and its medications. Within these expertise networks, state actors played a central role in forming (de)centralized professional associations for managing these medical conditions. Specifically, during the Xi era, the Chinese

⁹ The drug sales data was obtained from PHARMCUBE, a medical consulting agency established in 2015.

¹⁰ Qichacha is a pioneering platform founded in 2014, providing comprehensive business data, credit information, and analytics on private and public companies to Chinese consumers and professionals via mobile devices.

state economized the medicalization and pharmaceuticalization of neurodevelopmental disorders in a techno-nationalistic way. By “economize,” I refer to Callon and Çalışkan’s (2009) theory of economization to denote a process by which the Chinese state has framed the management of chronic illnesses like TD and ADHD as economic issues, strategically supporting their medicalization and pharmaceuticalization to boost economic productivity. Given these dynamics, pediatric neurologists at public hospitals and Sinopharm-RedFlag capitalized on such political opportunities to align their professional and corporate interests with national ones, thus building a centralized professional association around tics and LittlePatch.

In the first section of my empirical analysis, I will lay out the necessary conditions that would act as groundwork for the institutional disparities in the subsequent Xi era. I will show how the varying states of biomedical knowledge have historically formed distinct networks of expertise for both medical conditions. Specifically, I will show how “well-established” knowledge on ADHD shaped dispersed and fragmented professional networks and a drug market dominated by American pharmaceuticals, while contested knowledge on TD formed a cohesive and tight-knit professional network and a niche in the pharmaceutical market to exploit.

In the second section, I will demonstrate how the increasing influence of the Chinese state in both the healthcare and pharmaceutical sectors gave rise to the institutional disparities during the Xi era. I will first illustrate how the Chinese state economized the medicalization and pharmaceuticalization of neurodevelopmental disorders in a techno-nationalistic way by adopting “lifecycle health management” for chronic illnesses and spurring domestic developments of innovative drugs. I will then show how pediatricians and Sinopharm-RedFlag aligned their interests with those of the state to capitalize on such political opportunities to establish TDAC and carve out

a distinct market for LittlePatch.

1. Before the Xi era: Biomedical Knowledge shaped networks of expertise

The varying states of biomedical knowledge concerning TD and ADHD, particularly in terms of diagnosis rates and treatment approaches, shaped distinct networks among medical professionals and different market statuses of pharmaceutical medications for each diagnosis before the Xi era. These conditions laid the groundwork for the emergence of institutional disparities during the subsequent Xi era.

1.1 Knowledge on diagnosis shaped distinct professional networks

1.1.1 Dispersed and fragmented knowledge networks of ADHD professionals

During the 2000s, ADHD has been regarded as a relatively common diagnosis affecting children in China. The shortage of pediatric practitioners in China at the time led professionals across multiple pediatric departments to draft clinical guidelines to manage ADHD, thus forming a dispersed and fragmented network of professional jurisdiction over ADHD. This ecology would make it challenging for medical professionals to coordinate a centralized national-scale association in the subsequent Xi era.

Since the introduction of DSM-III into China during the 1980s, ADHD has soon garnered significant clinical attention, driven by the rising concerns of parents from the growing middle class in China's urban areas. They perceived ADHD symptoms as having a direct impact on their children's academic performance, a matter of primary importance. With patients and parents

flooding into hospitals and clinics, ADHD has been gradually recognized as the most common mental disorder affecting children and adolescents. This situation in the early 2000s made Chinese pediatricians identify an urgent need to formulate clinical guidelines for the management of ADHD.

However, the fact that the country confronted a long-standing shortage of pediatricians led medical professionals across multiple pediatric departments to collaborate to draft the clinical guidelines at the time. As of 2014, there were only 118,000 pediatricians in China, averaging a mere 0.53 full-time pediatricians for every 1,000 children aged 0 to 14 (National Health and Family Planning Commission of PRC, 2016). In comparison, developed countries boasted a ratio ranging from 0.8 to 1.5 (Liu et al., 2018). Over the past fifteen years, there has been only a modest increase of approximately 5,000 pediatricians in China (Liu et al., 2018). The shortage is even more acute in the field of pediatric mental health, with fewer than 500 qualified full-time child and adolescent psychiatrists nationwide (Zheng, 2020). Moreover, while ADHD fell under the jurisdiction of developmental-behavioral pediatrics in the U.S., China did not establish its own field of developmental-behavioral pediatrics until 2011 (Jin, 2015).

Therefore, the scarcity of pediatric practitioners and the late development of developmental-behavioral pediatrics necessitated collaboration among professionals across various pediatric departments to develop clinical protocols and manage ADHD during the 2000s. In China, the formulation of clinical protocols typically advances through a documental sequence from “*Recommendations*” progressing to “*Consensus*,” and finally culminating in “*Guidelines*.” As we can see in the byline of “*Recommendations for the Diagnosis and Treatment of ADHD in Children*” (2006), this foundational document for drafting Chinese pediatric guidelines for ADHD in later years was jointly signed by multiple pediatric departments.

As a result, the knowledge network of ADHD professionals in China was dispersed and fragmented across multiple pediatric departments from its beginning. This situation would make it hard for ADHD professionals to conduct collective action uniformly. An experienced physician in TDAC's Shanghai branch noted to me the disparities in the professional management and engagement of ADHD and TD:

ADHD has been managed by multiple departments (in pediatrics): neurology can treat ADHD, psychology can as well, and pediatric health care also deals with it. Yet, involving several departments can result in no one being fully invested. In contrast, while TD can also be treated by various departments, the current situation in China is that, the formulation of "Consensus" is spearheaded by the neurology group. As for ADHD, the involvement of multiple sectors, from the pediatric health care department discussing it to the psychology department referencing it in lectures, might deter the neurology department from being fully engaged. (attendant physician, Shanghai, interview)

Moreover, the dispersion of these professionals across multiple pediatric departments introduced the potential for nuanced interpersonal dynamics that could pose challenges to the establishment of a centrally organized association. Dr. W, a distinguished chief physician in Shanghai, shared with me a typical case between two prominent figures in the field of ADHD when I asked her about the constitution of professionals in TDAC:

In fact, the reason why, as you mentioned, Dr. D [a famous child psychiatric expert in

Shanghai] is not involved in TDAC, is that Dr. Z has been in and has taken a leading role in TDAC. Although both of them are esteemed professionals, their approaches and philosophies towards treatment can vary, possibly leading them to work separately. (field notes, June 7, 2023)

This conversation took place during a workday lunch at Dr. W's team office, which served as a comfortable home base for her to answer my questions very openly. Invited as a guest and surrounded by her team of proteges, I was initially puzzled about the distinctions in such "philosophies" and requested Dr. W to elaborate. Then, one of her proteges chimed in with euphemisms, "*they are simply not working together.*" Nonetheless, Dr. W proceeded to elucidate the nuances for me with patience:

Both Dr. Z and Dr. D are renowned figures in the field. Why aren't they working together? We won't be sure. It's all about contingencies¹¹ and finding like-minded individuals. It's all about relationships and who you choose to be as friends, you got me? We naturally gravitate towards those we're familiar with, and then you do things together. These collaborative groups like TDAC are not government-initiated. If they were, everyone would be grouped together. Rather, it's about having a shared vision. (field notes, June 7, 2023)

¹¹ This reflects the Chinese concept of "yuan'fen" (缘分), a term that encompasses ideas of fate, destiny, and serendipity in bringing people together and orchestrating events in their lives.

Here, when Dr. W pinpointed the propensity for professionals with aligned perspectives to collaborate, she was referring to the fact that Dr. Z and Dr. D were affiliated with different pediatric departments, so they adopted very distinct approaches to treating ADHD. This was a typical case in the professional field of ADHD, where the dispersed and fragmented nature of the professional network could make it very challenging to form a national-scale hierarchical association.

To conclude, when the biomedical knowledge on ADHD was disseminated across the professional field in China during the early 2000s, it fostered a scattered professional network. Fragmented across various pediatric departments, experts operated within a matrix of dispersed jurisdiction. This ecology made it hard to coordinate collective engagement or orchestrate national-level initiatives, thus precluding ADHD from forming a hierarchical professional association in the subsequent Xi era.

1.1.2 Cohesive and homogenous knowledge networks of TD professionals

Unlike ADHD, TD was less recognized and considered far less common up to the early 2000s. The limited clinical attention at the time made the professional jurisdiction over the biomedical knowledge of TD sufficiently consolidated within the domain of pediatric neurology—an arrangement paralleling that in the U.S. These circumstances fostered a close-knit and homogeneous network of professionals for TD, laying the organizational infrastructure for the later shaping of TDAC during the Xi era.

The boom of mobile Internet around the 2010s greatly facilitated the diagnosis of TD, leading many more parents to seek medical intervention for their kids. As diagnoses of TD grew rapidly but its effective treatment approaches remained contentious, the emerging gap in professional

knowledge prompted Chinese pediatricians to formulate standardized clinical protocols for managing TD. These efforts aimed to create a uniform consensus to guide practices concerning the rising TD cases within an institutional framework. This intent was explicitly reiterated by the then-leading committee of the TDAC. Dr. Jiong Qin, one of the three senior consultants for TDAC, explained the motivation behind forming the association during TDAC's 2021 Online Training Conference on Standardized Diagnosis and Treatment.

Tics have been prevalent and come with complexities. They manifest across various organs and are frequently associated with mental, neurological, psychological, and behavioral concerns, thereby engaging multiple disciplines. Such complexities breed uncertainties in clinical practices... Often, our frontline practitioners grapple with these queries, unsure of the best approach. This necessitates us neurology society and pediatric colleagues to adopt an updated approach. It is imperative to disseminate authoritative, standardized, and clinically applicable knowledge that distinctly dictates diagnosis, treatment, and necessitates apt training. (TDAC conference recording, 2021)

Compared with the established knowledge of ADHD at the time, the historically scant clinical focus and limited research progression for TD opened up a space for a network of expertise around 2010. A senior physician in TDAC's Shanghai branch highlighted to me the marked disparities in the state of biomedical knowledge between TD and ADHD. She emphasized that, while the current medications for ADHD were "*well-established*", the establishment of TDAC reflected concerted efforts to address the intricate nature of TD, which was going with a surging prevalence.

ADHD has been already incorporated into several major psychiatric guidelines in China.

While TD currently only has a “Consensus.” Unlike “Guidelines,” “Consensus” is just based on “what I think, what he thinks,” and everyone has come to an agreement. It doesn’t carry the same weight or authority as “Guidelines,” which demand extensive research and comprehensive understanding and provide a more precise and authoritative guide on diagnosis and treatment...While ADHD already captured significant attention and doesn’t necessitate a dedicated organization to increase its prominence, I feel that the attention given to TD is not sufficient. TD requires such initiatives like TDAC and that’s why there’s a need for such a collaborative group to bring this issue to the forefront.

(associate chief physician, Shanghai, interview)

While the response to surging diagnoses of ADHD and TD involved similar processes of formulating standardized clinical guidelines, the different structures of their professional networks led to distinct organizational outcomes. Unlike the dispersed professional jurisdiction over ADHD knowledge across multiple pediatric departments, its TD counterpart was consolidated within a single department. The *“Recommendations on the Diagnosis and Treatment of TD”* was exclusively signed by the Chinese Child Neurology Society and published in 2013. This cohesive network of TD professionals would facilitate the later initiation of a centralized association, spearheaded by leading pediatric neurologists.

The formation of TDAC was a top-down process, heavily influenced by the homogeneous component of pediatric neurologists and their close interpersonal relationships. The consultants of

TDAC were composed of the most senior figures in the pediatric field, with all three male leaders holding senior positions in the Chinese Child Neurology Society (CCNS). Among them, it was Dr. Jiong Qin, the former head of CCNS, that advocated for the initiation of TDAC. And it was under Dr. Qin's authorization that Dr. Liu, the incumbent deputy head of CCNS, then assumed leadership of TDAC. At the 2022 TDAC Annual Conference¹², Dr. Liu publicly acknowledged Dr. Qin's support by lauding his foresight in proposing the TDAC initiative. Dr. Liu also expressed his gratitude for Dr. Qin's generosity in delegating him the authority to lead the initiative during Dr. Qin's tenure as head of CCNS.

At the end of 2017, during the Plenary Meeting of the Chinese Child Neurology Society, Professor Qin advocated for the establishment of a specialized group towards targeted disorders and authorized me to lead this initiative, spearheading the establishment and development of TDAC dedicated to the specialized field of TD. (2022 Annual Conference of TDAC, recording)

In my pursuit to deepen my understanding of the dynamics within TDAC's formation, I had a crucial conversation with Dr. Fen, a senior pediatrician and one of the deputy leaders of TDAC's Shanghai branch. Our interview was strategically held at a Starbucks, where the bustling background noise provided a cover for our discussion. This setting allowed Dr. Fen to adopt a relaxed mindset, making her more willing to share with me a comprehensive account of her insights

¹² This conference was originally planned as a grand event in Taiyuan, Shanxi province, where RedFlag is based, but was interrupted by pandemic-related lockdowns.

into the origins and development of TDAC.

During the early period of our interview, Dr. Fen highlighted the pivotal role Dr. Liu played in spearheading the establishment of TDAC, echoing what many of the other interviewees of senior positions had informed me. As our conversations progressed, however, she noted that his personal efforts would not have been as smooth and successful without the significant authority and backing from the other senior male pediatric neurologists within the CCNS.

First and foremost, this is because Dr. Liu serves as the deputy head of the Child Neurology Society of our Chinese Society of Pediatrics. If you hold a position at the national level, your authority will undoubtedly be stronger, and you'll have more resources. When you have an idea and want to do something, you definitely need the necessary support. If not, there might be situations where others want to do something, even if you also want to, they might not be willing to let you do it. So, my understanding is, first, there is someone willing to take the lead, like Dr. Liu willing to initiate and carry out the task [of initiating TDAC] even though it requires many efforts. Second, he can get the necessary support from all aspects, and can receive a positive response from everyone.

These might all be big issues. (associate chief physician, Shanghai, interview)

Dr. Fen also confirmed the strong camaraderie among the male leaders within CCNS, and she explained how their close interpersonal relationships facilitated a smooth establishment process for TDAC at the central level. Therefore, the moment when Dr. Liu proposed the establishment of TDAC, he was claiming with the voices of several key figures, including Dr. Qin and Dr. Jiang,

who acted as his spokespeople to support his initiative.

They have been friends for years, you know. Professor Qin is the prestigious leader of our academic group, the Chinese Child Neurology Society. He was among the most senior. Now the head is Professor Yuwu Jiang [another senior consultant of TDAC]. Right, so they both are [neurology senior fellows]. Overall, at the very least, you have to obtain their approval and support [to initiate TDAC]. Without a certain level of authority and recognition, when you want to do something on your own, if they don't endorse or support you, you won't be able to achieve it. (associate chief physician, Shanghai, interview)

With the tightly-knit network of elite pediatric neurologists, the founding process of TDAC at the provincial level was then executed as a top-down assignment. As evident from the membership rosters, all provincial leaders were specialists in pediatric neurology. This homogeneity among TD professionals streamlined the organization-making process. To further understand how pediatricians at the provincial level became affiliated with TDAC, I used Shanghai as a case study. Dr. Fen continued her elaboration, shedding light on the pathways these pediatricians followed to join TDAC.

The main purpose of establishing such a collaborative group [TDAC], I believe, is to manage and oversee everything from the top side down. It's still led by the neurology group. As I mentioned earlier, as Dr. L is also our neurology group leader [in Shanghai]. The neurology group took the initiative and brought together experts from related

hospitals within relevant departments. (associate chief physician, Shanghai, interview)

In this context, the cohesive professional network within pediatric neurology played such a role that the departmental homogeneity made the alignment process appear “natural,” rendering the question of “how did you join TDAC” almost redundant to the physicians. My conversations with Dr. L, the head of the Shanghai branch, took place in her office after she had finished a full day’s work. She just succinctly replied:

I was invited as an expert [in neurology], so I went. It’s like when they established TDAC in Wuhan, then Dean Liu said, “Director Li, how about you joining our TD Collaboration Group?” And I responded, “Sure,” and that was that. (chief physician, Shanghai, interview)

This sense of taken-for-grantedness was not only prevalent among the provincial heads but also permeated the perceptions of rank-and-file physicians in the provincial branches. When I inquired of a junior pediatrician about how he joined TDAC’s Shanghai branch, he explained to me:

It’s actually related to the department. Our department is under the broad category of neurology and beneath any large category, there are sub-specialties for certain illnesses... A few years ago, I was part of the sub-group focusing on TD, so later I joined the Shanghai TD group. Essentially, our department primarily assigned certain doctors in the sub-group to handle TD. (attendant physician, Shanghai, interview)

To conclude, when the biomedical knowledge on TD was disseminated across the professional field in China around 2010, it formed a cohesive and tight-knit network of TD professionals, especially pediatric neurologists. This ecology of the TD professional network facilitated the subsequent initiation of a national-scale association with a hierarchical structure.

1.2 Knowledge on treatment approaches shaped distinct pharmaceutical market statuses

1.2.1 Well-established prescriptions for ADHD

As biomedical knowledge regarding effective prescriptions for ADHD was considered “well-established” among pediatricians, the pharmaceutical market for ADHD drugs in China was dominated by medications of American capital background. This status then limited the opportunities for the development of Chinese indigenous drugs within the domestic pharmaceutical market.

Pediatricians at public hospitals widely regarded the effective prescriptions for treating ADHD as “well-established.” They particularly noted the efficacy of Concerta¹³ and Strattera¹⁴. As a prestigious expert pointed out to me, the “well-established” status of ADHD prescriptions was based on extensive research work and the notable therapeutic effects of those mainstream medications,

¹³ Concerta is produced by Xi'an Janssen Pharmaceutical Co., Ltd, which was a major subsidiary of Johnson & Johnson in China. The active pharmaceutical ingredient (API) of Concerta is Methylphenidate hydrochloride.

¹⁴ Strattera is manufactured by Lilly Suzhou Pharmaceutical Co., Ltd and fully supported by Eli Lilly and Company. The API of Strattera is Atomoxetine.

which outperformed alternative prescriptions.

There has been extensive research on ADHD, and its medications are now “well-established”, right? The research on ADHD commenced early. However, TD has only recently garnered more research attention.....ADHD treatments are well-established, while alternatives can't work for it as effectively as those Western medicine does. It's tough; the results [you get when using alternatives] are just not as good. The [usage of] these two drugs for [treating] ADHD are very mature... The efficacy of alternatives for [treating] ADHD is not as good as [the alternatives] for TD...TD are where alternative medications can show their strength, but ADHD is not. (chief physician, Shanghai, interview)

The pharmaceutical market for ADHD prescriptions in China has long been dominated by Strattera and Concerta, both flagship products of American pharmaceutical giants. With their efficacy well recognized by medical professionals, both drugs have solidified their “status” as primary options for ADHD prescriptions at public hospitals. However, their market dominance has hindered the development of Chinese indigenous drugs. For instance, in the case of Concerta, there was a domestic firm once producing a generic variant of Concerta at just one-twentieth of its original price in the 2000s, but it ceased operations in 2012 for undisclosed reasons.¹⁵ Since then, J&J has maintained a monopoly over the Concerta market in China.

¹⁵ A primary hypothesis suggests that China's strict regulations on stimulants, including Concerta, may be a contributing factor. Another hypothesis centers on the coercion and pressure exerted by Janssen to force the domestic firm to cease functioning.

This dominance would have remained unchallenged if not for the expiration of patent protections, which would lead to a dramatic price reduction and competition from generic drugs. Strattera faced this scenario when its patent expired in 2017. While Strattera was priced at 196 RMB for a week’s supply before its patent expired, multiple domestic companies began producing generics at a more affordable price of 82.2 RMB for a week’s supply. However, Concerta is expected to maintain its price at a considerable 328 RMB for a week’s supply in the foreseeable future until its patent expires in 2032.

Despite potential challenges, sales for both drugs have experienced significant growth in the market. According to accessible drug sales data over the last five years, both drugs have consistently generated annual revenues exceeding 100 million RMB in Chinese public hospitals since 2018, as depicted in chart 1 below.

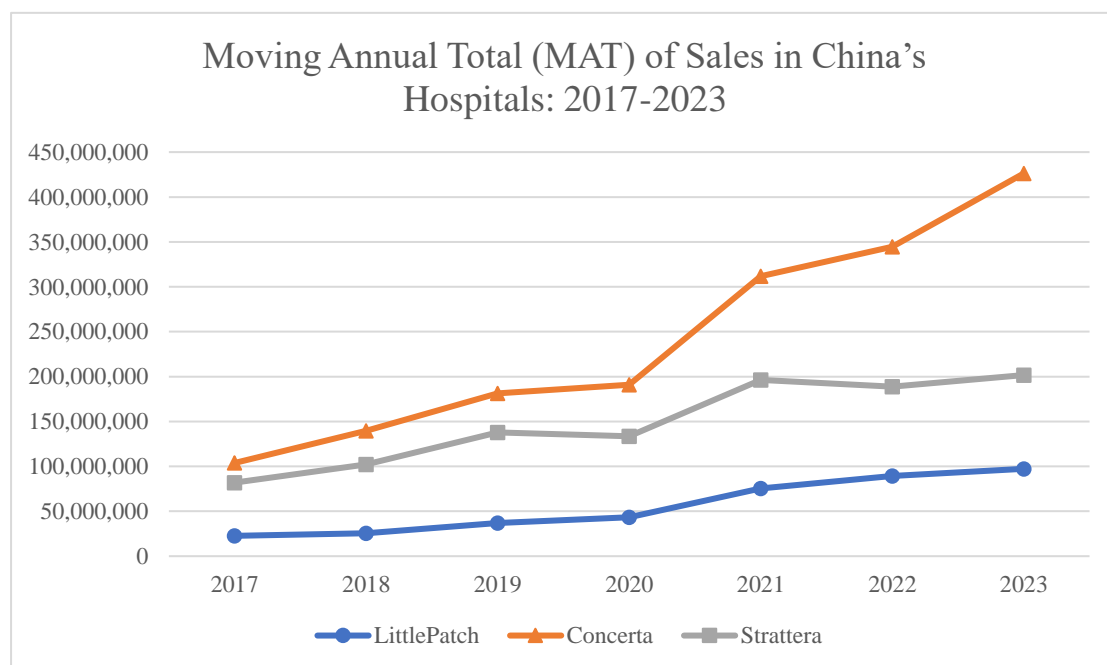


Chart 1

To conclude, the widely recognized “well-established” knowledge regarding effective prescriptions for ADHD resulted in market dominance by American pharmaceuticals. The foreign capital background of both Concerta and Strattera would pose a hindrance to Sino-foreign joint ventures from funding a national-scale professional association during the Xi era.

1.2.2 Market niche for TD

As the biomedical knowledge of effective prescriptions for TD was considered contentious, the pharmaceutical market for TD drugs in China remained in a nascent state for long. This status provided a space for claimants of pharmaceutical expertise and motivated Chinese pharmaceutical corporations to innovate and develop drugs that could carve out a niche in the market.

Contrary to ADHD, given the intricate nature of tics, there was no definitive medication ensuring an effective prognosis for TD in China or worldwide. While traditional antipsychotics like Haloperidol could provide some relief, they often came with pronounced side effects like dizziness. Moreover, due to their generic status and low pricing, traditional antipsychotics failed to generate significant revenue in the market.¹⁶ This led to a situation where no drugs dominated the TD prescription market in China, thereby creating a niche for domestic pharmaceutical companies to develop new drugs.

Originally developed as prescriptions for treating hypertension, Clonidine transdermal patches (CTP) were later found to be efficacious for off-label TD treatment with fewer side effects

¹⁶ Traditional antipsychotics like Tiapride Hydrochloride and Haloperidol are priced at less than 30 RMB for several months' supply.

associated with antipsychotics (Goetz et al., 1987; Leckman et al., 1985).¹⁷ However, much of the research in Western countries showcasing clonidine's efficacy in TD treatment employed oral formulations at the time. Moreover, these early studies exploring CTP's impact on TD were limited by their small scale of subjects (Gancher et al., 1990). A sample size of merely nine patients could not perform as strong spokespeople to build solid enough alliances between CTP and TD treatment.

It was Chinese pediatricians who pioneered large-scale clinical research to verify the therapeutic effectiveness of CTP in treating TD. In a landmark study conducted in 2005, Dr. Yasong Du at the Shanghai Mental Health Center spearheaded a "randomized double-blind multicentre placebo-controlled clinical trial of CTP for the treatment of TD" (Du et al., 2008). This study used CTPs supplied by RedFlag¹⁸ with dosages appropriately adjusted for pediatric subjects.¹⁹ A significant sample size of 437 patients aged 6–18 years was enrolled as spokespeople for the efficacy of the patch. Their treatment outcomes were inscribed into three tables featuring standardized scores to reinforce the scientific credibility of RedFlag's CTP in treating TD.²⁰ In the discussion section, Dr. Du claimed,

These data are the first to conclusively demonstrate, through a rigorous controlled trial, the effectiveness and safety of the clonidine adhesive patch for the treatment of tic disorders in children and adolescents (Du et al., 2008).

¹⁷ These side effects include weight gain, metabolic changes, or extrapyramidal symptoms.

¹⁸ The predecessor of Sinopharm-RedFlag at the time.

¹⁹ In Dr. Du's study, the dosage of the clonidine adhesive patch was 1.0 mg, 1.5 mg, or 2.0 mg per patch for a week's use.

²⁰ As Tables 3-5 in the appendix show.

The publication of Dr. Du's study in the *Australian and New Zealand Journal of Psychiatry* in 2008 and its subsequent global citations strengthened the alliances between RedFlag's CTP and Chinese leading pediatricians. Capitalizing on the robust clinical evidence, RedFlag trademarked "LittlePatch" for its modified-dose CTP. In the following year, LittlePatch was included in the 32nd edition of US Pharmacopoeia (USP), thus setting the worldwide formulation standard for CTP in the treatment of TD.

With the "golden standard" in clinical trials, these moves made Chinese pediatricians' clinical research and RedFlag's LittlePatch become the "obligatory points of passage"²¹ in terms of effective biomedical prescriptions for TD. Here, the translation²² becomes: if the world wanted to use CTP to treat TD, refer to LittlePatch, founded on RedFlag's innovation and validated by Chinese clinical expertise.

Despite these potential advantages, LittlePatch's market influence remained small at this stage, with its prospective value yet to be fully realized. Heavy investment in drug development and manufacturing infrastructure pushed RedFlag to the verge of financial unsustainability. A physician engaged in the later stages of LittlePatch's clinical trials acknowledged this precarious state.

They [RedFlag] were in the red for quite a while. It felt like they couldn't sustain themselves any longer at that time, and as I can remember, they were eventually sold to Sinopharm. (associate chief physician, Shanghai, interview)

²¹ By "obligatory points of passage," I refer to in the notion in Callon's analysis (1986). An obligatory point of passage is created as a result of "problematization", where an actor positions itself as indispensable to other actors within the network for the achievement of their goals.

²² By "translation," I refer to "the interpretation given by the fact-builders of their interests and that of the people they enroll (Latour, 1987:108)."

To conclude, the contested knowledge on effective prescriptions for TD created a market niche for domestic pharmaceutical corporations to develop indigenous drugs. One critical component that would make a difference in future institutional disparities was the indigenous development of LittlePatch at the time, although it primarily involved adjustments in dosage delivery technologies rather than the invention of entirely new active pharmaceutical ingredients.

2. During the Xi era: State actors precipitated institutional disparities

During the Xi era, the Chinese state pursued its own ambitions to situate itself as a global superpower, so the state markedly increased its influence in the healthcare and pharmaceutical sectors. With these interests, TD became a much more attractive diagnosis than ADHD due to its perceived potential for innovation and development at the time. Pediatric neurologists and Sinopharm-RedFlag then capitalized on this political opportunity to align their professional and corporate interests with national aspirations. As a result, the cohesive professional network among pediatric neurologists acted as organizational infrastructure and the state-capital background of Sinopharm-RedFlag lent a source of political legitimacy to establish TDAC and carve out a distinct market for LittlePatch.

2.1 Healthcare domain: pediatricians aligned early interventions in ties with the state's aspirations in lifecycle management

In the healthcare domain, the Chinese state has adopted "lifecycle health management" to address the ever-increasing expenditures on chronic illnesses. The rationale was to intervene with

medical conditions at the earliest stages of life to reduce long-term healthcare costs. In line with this approach, the China Population Communication Center²³ identified ADHD and TD as primary targets for early intervention in neurodevelopmental disorders during childhood. Pediatricians have come to view early medical intervention for tics as a “cost-effective” (“economic”) strategy to prevent the progression of TD into more severe mental and psychological comorbidities, which could severely impair social functioning in later life stages. Their sequential interpretations, based on a techno-scientific assumption that mental and psychological problems stem from neurological origins, aligned with the state’s intention of implementing health management interventions at the earliest stages.

Confronted with a profound epidemiological shift, chronic illnesses have consumed over 70% of total healthcare expenditure in China during the 2010s (State Council of PRC, 2019). To alleviate this substantial economic burden, the Chinese state has been formulating a national healthcare strategy to enhance population health management since the Xi era. At the National Health and Wellness Conference in 2016, President Xi Jinping formally introduced the concept of “*mass health*.” He further elaborated on the aim to “*protect the people’s health in all respects and throughout their entire lives*” at the 19th CPC National Congress. This vision culminated in the “Outline of the Healthy China 2030 Plan”²⁴ (Outline) blueprint, emphasizing the life-cycle management of chronic illnesses and the significance of early medical intervention. The State Council’s subsequent “Outline

²³ China Population Communication Center (CPCC) was a public institution directly affiliated with the China National Health Commission (NHC). The CPCC later evolved into the National Center for Mental Health, a national-level technical institution newly set under the China NHC with a focus on mental health in 2021.

²⁴ This is issued by the Chinese Central Government and State Council.

on the Development of Chinese Women and Children (2021-2030)” and the CPCC’s “Maternal and Child Health Literacy Promotion Plan” (2021) highlighted that safeguarding the health rights of women and children and fostering their all-round development is to bolster national health from its very source and foundation. Within this framework, psychological and mental issues stood out as one of the most critical concerns, from which TD and ADHD were specifically identified by the CPCC as two principal conditions that affect children’s healthy growth yet have favorable treatment outcomes.

Leading pediatricians in China have not only seized such political opportunities but have also played a significant role in shaping them. Elite professionals like Dr. Yi Zheng have been instrumental in this regard. Dr. Zheng has served in a dual capacity as a foremost authority in the development and implementation of the “Child Health Literacy Promotion Plan” and as one of the principal consultants for the TDAC. As a pioneer in the Chinese field of ADHD, Dr. Zheng played a pivotal role in introducing the concept of “lifecycle health management” to China following the revision of the DSM-5 in 2013.²⁵ He has since been a vocal proponent of this approach, delivering numerous lectures to disseminate the concept further. In his presentations, Dr. Zheng frequently referenced his concurrence with Michael Rutter’s views²⁶ (2018) that, childhood ailments have a tendency to persist into adulthood rather than simply dissipating with maturity. Therefore, he argued, it was essential to identify and address these conditions at the earliest opportunity.

²⁵ According to Zheng, this perspective stems from the 2013 DSM-5 revision, which grouped TD and ADHD together under the category of “neurodevelopmental disorders.”

²⁶ In Zheng’s description, Michael Rutter played a pivotal role in crafting the children’s section during the ICD-11 revision.

Children and adolescents deserve our primary attention because psychological issues during these early stages can then impact their entire lives... We used to think children were simple, but in fact, their issues can be much more complex... The peak periods for cellular and neural synapse development occur during these years, a period when the brain is the most susceptible. So, many mental illnesses have their latent origins in childhood. Conditions like ADHD, autism, and TD, persist rather than dissipate with age. (Lifecycle Health Management 2020, lecture recording)

This argument was anchored in the biomedical belief that psycho-mental issues could find their origins in neurological foundations. Although the etiology of TD remains a subject of debate until now, the tangibility and visibility of its symptoms lent credence to such solid belief in an existing “biological basis” for tics (Good, 1993), hypothesizing them as dysfunctions within particular areas of the central nervous system.²⁷ The embodied “nature” of TD’s symptoms, evident in discernible gestures and physical movements, stood as irrefutable “hard facts” (Latour, 1987) for such explanations. Proceeding from the techno-scientific premise that mental and psychological problems are rooted in neurological issues, it then led to a corollary that early interventions in tics would be more likely to prevent the progression of TD into more severe mental-psycho comorbidities in later life stages, which could significantly impair patients’ social functioning.

²⁷ In medical terms, the etiology of Tic Disorders (TD) is believed to reside in the basal ganglia and frontal lobes of the brain, which regulate voluntary motor movements.

Indeed, TD often remains unresolved. Sometimes tics may mitigate but then evolve into obsessive-compulsive disorder (OCD), with many adults experiencing both conditions simultaneously. Prevalent among children and adolescents, TD often co-occurs with other comorbidities. One of the most critical aspects of managing TD throughout lifecycle is the vast distinction of severity, ranging from transient tics to Tourette's syndrome. While mild forms may not require treatment, severe forms can be difficult to treat. Even with surgery, many are essentially untreatable as TD is so complex a disorder. Thus, early treatment and intervention can lead to better prognosis. Many TD cases become untreatable due to a lack of early proper diagnosis and treatment. This makes TD a disorder worth special attention in the lifelong-cycle management. (Lifecycle Health Management 2020, lecture recording)

To strengthen his argument, Dr. Zheng referenced a human capital investment-return graph²⁸ (Carneiro & Heckman, 2003) in his lecture to illustrate the benefits of early interventions in managing lifelong mental health. The graph presented a declining curve that showed the rates of return per dollar invested in human development at different ages. The highest returns could be achieved during the earliest years, with medical interventions at the pre-school period yielding a steeply higher rate than school or post-school counterparts. This visual representation acted as an inscription device (Latour, 1987) to effectively translate the importance and necessity of early medical interventions on the onset of tics into economic rationality of cost-effective investments in human capital development.

²⁸ Figure 1 as attached.

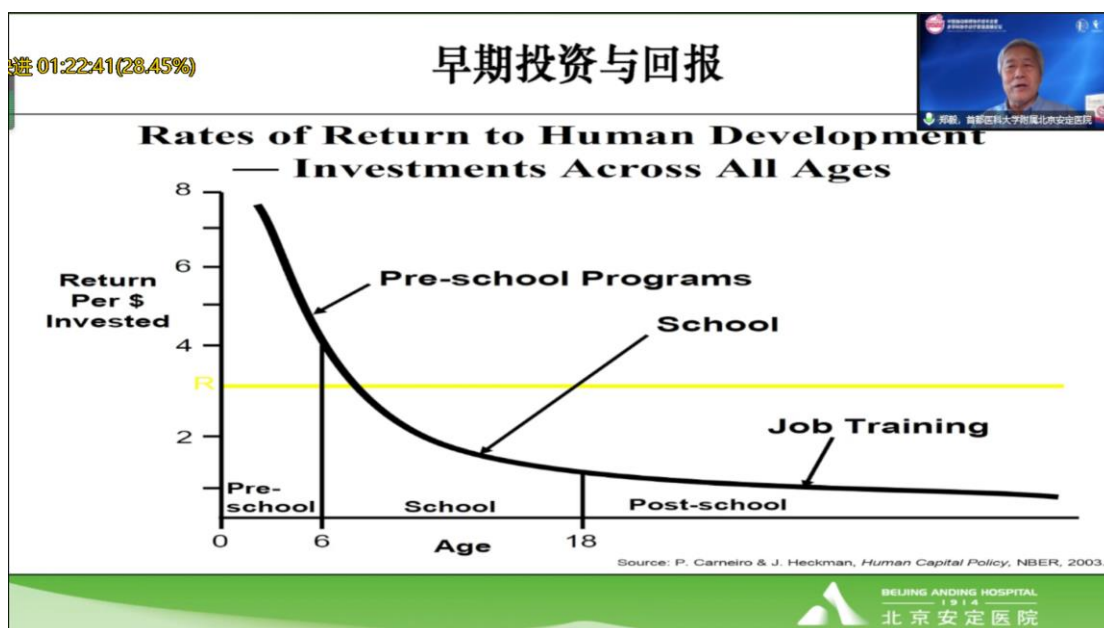


Figure 1

As leading professionals in state agencies like Dr. Zheng perceived early interventions in childhood neurodevelopmental disorders as a proactive step to mitigate their progression into more severe psycho-mental complications in later life, such interpretations were also pervasive among rank-and-file professionals in local branches. The pediatricians I interviewed shared a consensus on the promising prognoses of TD regarding its relatively low impact on social functioning, especially when compared with other psycho-mental comorbidities. The assumption that psycho-mental comorbidities are rooted in neurological foundations led pediatricians to conclude that early intervention in TD appears to be an “economic” approach.

Considering the broader psychiatric landscape, there are many disorders that elude complete resolution. There's no solution for intellectual developmental disorders. People

acknowledge ADHD for its marked impact on functioning. Then, for autism spectrum disorders, the impact is definitely greater, right? Yet, TD stands out with its positive prognosis, especially concerning its impact on social functioning. We often say that tics themselves don't have much impact on executive function. However, if there's comorbidities with ADHD, it's likely that ADHD affects social function [much more]. Even as tics persist into adulthood, their influence on daily functioning remains relatively minimal for many. A medicated patient with mild TD can often work, study, and maintain social relationships much like anyone else. But it's different when accompanied with other mental disorders. In this scenario, such an intervention strategy on TD could be the most economic (cost-effective). (associate chief physician, Shanghai, interview)

To conclude, based on the techno-scientific belief that psycho-mental comorbidities have neurological origins, pediatric neurologists adopted early intervention strategies for treating TD. Their objective was to inhibit the progression of neurodevelopmental disorders into more severe conditions that could significantly disrupt social functioning. This professional approach resonated with the state's interests in economizing the long-term expenditure on managing chronic illnesses.

2.2 Pharmaceutical sector: Sinopharm-RedFlag aligned LittlePatch as “First-Class New Drug” with state's aspirations in biopharmaceutical innovations

In the pharmaceutical sector, the Chinese state launched anti-corruption reforms to spur the development of indigenous innovative drugs (Li, 2021; Zhang and Wu, 2012). Given this, the

National Medical Products Administration²⁹ tightened the criteria for what counted as first-class innovative drugs to incentivize authentic biopharmaceutical breakthroughs. Sinopharm-RedFlag leveraged the reclassifications within these policy adjustments to “black box”³⁰ LittlePatch as a premier Chinese “Class 1 New Drug.” This designation not only bestowed symbolic prestige upon LittlePatch but also resonated with the state’s nationalistic aspiration for innovations in the pharmaceutical industry.

To enhance its competence as a superpower, the Chinese government has consistently prioritized the advancement of its biopharmaceutical sector. Since China’s 12th Five-Year Plan, biotechnology has become one of the seven priority industries (Cao, 2019). With escalating geopolitical tensions with the U.S., successive economic plans have further emphasized the imperative to bolster domestic innovative capabilities and nurture an independent biopharmaceutical sector, with a broader vision for an autonomous bioeconomy.³¹ The state aimed to elevate its pharmaceutical industry up the value chain, transforming it from a domain marked by low-value, low-quality production to an innovation-driven powerhouse (Hughes, 2010; Wahlberg, 2017). However, the Chinese pharmaceutical sector grappled with historical challenges, characterized by a fragmented landscape filled with numerous small-scale enterprises displaying variable competency levels. This fragmentation, coupled with the inherent high risks associated with

²⁹ The National Medical Products Administration (NMPA) is a national bureau responsible for drug supervision under the State Council of China and is managed by the State Administration for Market Regulation. It was founded on the basis of the former State Food and Drug Administration (SFDA).

³⁰ By “black box,” I refer to “the way scientific and technical work is made invisible by its own success (Latour, 1999:304).”

³¹ This is illustrated in the 13th Five-Year Plan for the Development of the Biotechnology Industry in 2017 and the 14th Five-Year Plan for the Development of the Bio-Economy in 2022.

innovative drug development,³² necessitated the intervention of state capital to catalyze biopharmaceutical advancement (Block and Keller, 2015).

In light of this, China's central authorities issued a guideline in 2015 aimed at deepening the reform of state-owned enterprises (SOEs). This reform was intended to enhance the competitiveness and efficiency of SOEs, while also ensuring their alignment with the strategic objectives of the state. Sinopharm has been at the forefront of this SOE reform in action. It spearheaded the mixed ownership reform by strategically investing in and acquiring non-state-owned enterprises that boasted innovative products. This approach has enabled Sinopharm to amalgamate the strengths of both the state and private sectors, combining state-backed financial resources with the efficiency and creativity of the private sector (Coplin, 2019). The result has been a marked enhancement in competitiveness and innovation, with an increase in industry concentration and a significant upgrade in the pharmaceutical industry as a whole. As Hongjun Liang, the Party Committee Secretary and General Manager of Sinopharm Investment, delineated the enterprise's strategy in a public interview,³³

Sinopharm Investment primarily focused on "selective tracks" in its investment domains, aiming to find "hidden champions" that possessed key core technologies in frontier areas.

This strategy allowed Sinopharm Investment to incubate the core technologies within the products, subsequently unlocking the value of those corporations.

³² This often boasts a success rate of less than 10%.

³³ Sinopharm Investment is a wholly-owned subsidiary of Sinopharm. It was renamed from China Pharmaceutical Industry Co., Ltd., which was established in 1964.

Within these contexts, LittlePatch's indigenous drug delivery technology laid the material foundation for RedFlag's acquisition by Sinopharm Investment in 2012. Here, the translation became: If Sinopharm, the biggest state capital in China's pharmaceutical sector, was looking for certain drugs with the potential to incubate into domestic innovations, choose LittlePatch produced by RedFlag.

Through the acquisition, LittlePatch stepped out of its laboratory to bear the potential of becoming a "representative" of Chinese indigenous innovation in biotechnology. However, far from making profits for Sinopharm-RedFlag, LittlePatch still needed maneuvers by personnel at this newly state-invested corporation to act as its spokespeople. After acquiring RedFlag in 2012, Sinopharm Investment gradually became the corporation's largest shareholder, injecting over 122 million RMB and raising its share value by 55%. This capital infusion bolstered the firm's production capabilities, allowing it to produce over 100 million patches annually. More important is that Sinopharm brought new strategic investors with rich experience in marketing to the managerial team as personnel changes. The following marketing strategy by new managers of Sinopharm-RedFlag was a substantial key move to black box LittlePatch as a hallmark of Chinese pharmaceutical innovation.

After the acquisition, Sinopharm-RedFlag subsequently promoted LittlePatch as a "First-Class New Drug." This endowed the product with symbolic national pride because this category represented the pinnacle achievement of Chinese pharmaceutical innovations. This move was in tandem with China's pharmaceutical reforms and the state's vision to upgrade its biopharmaceutical industry.³⁴ However, LittlePatch could not attain such a prestigious position without the

³⁴ This is evident in policies like the Opinion on Encouraging the Innovation of Drugs and Medical Devices by

reconfigurations of China's pharmaceutical policies, in which the classification standards for what is defined as a "first-class" new drug have changed over time.

Since 2015, the State Council has directed substantial moves towards spurring innovation in new drug development.³⁵ A pivotal initiative to drive this agenda was the recalibration of regulatory classification schemes by the National Medical Products Administration (NMPA) (Li, forthcoming). In the 2000s, the regulatory standards for new drugs in China were relatively lax. Since nominal "innovations" could bring substantial profits, it bred considerable corruption and impeded genuine innovation.³⁶ However, the reforms in 2015 tightened the criteria for the designation as a "Class 1 New Drug," demanding that such drugs "contain new chemical entities with clinical value and have never been marketed anywhere in the world (NMPA, 2016)."³⁷ RedFlag launched LittlePatch in 2008 and registered it as a "Class 1.6 New Drug" under more lenient criteria before the reform.³⁸ Since LittlePatch just innovated on the delivery technology rather than inventing a new chemical entity, it would have been technically classified as a "Class 2.2 New Drug," a category for new drug

Deepening the Reform of Review and Approval System and the Opinions on Carrying out the Quality and Efficacy Consistency Evaluation of Generic Drugs.

³⁵ This included the revision of drug classification standards, the adoption of a Priority Review and Approval process, and the inception of the Generic Drug Consistency Evaluation.

³⁶ Such nominal "innovations" include adjustments in dosage, such as changing pharmaceuticals from 3mg to 5mg.

³⁷ The New Classification System (2016 version) changed the previous chemical drug classification system (2007 version) and set forth new registration requirements for applicants. Under this system, "Class 1" refers to innovative new drugs that have never been marketed within or outside China, defined by active ingredients and their formulations that have clinical value and contain compounds with new structures and pharmaceutical effects.

³⁸ According to China Chemical Drug Registration classification regulations (2007 version), "Class 1.6" referred to drugs not marketed in the country of origin and China, with unapproved new indications at home and abroad added for marketed preparations.

preparations using innovative dosage forms based on known chemical entities, under the post-reform standards.

Yet, seizing this nuanced advantage, Sinopharm-RedFlag astutely framed LittlePatch as a symbol of Chinese pharmaceutical innovations. By becoming this symbol, LittlePatch was then able to galvanize support from state actors and a wide range of actors that were loosely connected to the state. During TDAC's annual conferences, promotional videos from Sinopharm-RedFlag strategically articulated LittlePatch's status as a "First-Class New Drug," capitalizing on its associated nationalistic prestige, regardless of its version. This narrative translation portrayed Sinopharm-RedFlag's LittlePatch as an emblem of China's ingenuity in addressing the unresolved challenge of TD, a feat that the U.S. had yet to accomplish (Davis and Abraham, 2019). In this translation, LittlePatch got black boxed by spokespeople from Sinopharm-RedFlag to perform as China's pioneering innovation in the biopharmaceutical sector.

At this juncture, despite being heralded as a "First-Class New Drug," LittlePatch's innovative potential was more of a symbolic representation rather than material gains. The market for LittlePatch remained largely untapped, and Sinopharm-RedFlag was still losing money. For LittlePatch to transform into a commercially successful and commonly prescribed treatment, it was imperative to build alliances with medical professionals and consolidate its network through established institutional channels.

To conclude, Sinopharm-RedFlag capitalized on the evolving classification standards of innovative drugs within the pharmaceutical reform to black box LittlePatch as a prestigious "First-Class New Drug." This marketing approach aligned with the state's interests in transforming its pharmaceutical industry into an indigenous innovation-led powerhouse.

2.3 Convergence: The establishment of TDAC and the market boom of LittlePatch

Chinese pediatricians have long been under-compensated by state allocations, but they needed more funding to advance clinical trials on researching the etiology and pharmacological treatments of neurodevelopmental disorders. However, during the Xi era, with the national aspiration of building a self-reliant biopharmaceutical sector, securing such funding in an institutionalized way could be only feasible through state-invested corporations. A physician from Beijing confirmed such difficulties for foreign corporations to participate in strategic fields like medicine in recent years,

It's right for our country to protect national enterprises. Foreign companies, like Janssen and Eli Lilly, have profited significantly from China's medical funds by selling high-priced drugs [for ADHD] and then taking that money abroad. Although it's advantageous for us physicians to get financial support from them to hold academic conferences and exchanges, our country has tightened regulations in this area. For example, if a U.S. corporation supported a Chinese physician to attend an ADHD conference in the U.S., would it be compliant with current laws and norms to do so? (chief physician, Beijing, interview)

This situation made Sinopharm-RedFlag an “obligatory point of passage” when pediatricians at public hospitals in the fields of ADHD and TD want to seek funding. Then the translation became: If pediatric neurologists want to expand their influence in the professional field, consider domestic

corporation Sinopharm-RedFlag with the innovative drug LittlePatch as a viable and legitimate funding avenue to support their endeavors.

As is elaborated in previous sections, with the successful alignment of professional interests and national aspirations, the cohesive and homogeneous network within pediatric neurologists served as the organizational infrastructure for launching a national-scale hierarchical association. By contrast, the dispersed and disjointed network of ADHD specialists confronted more challenges in creating an association with a similarly top-down structure. On the pharmaceutical side, with the successful alignment of corporate interests and national aspirations, the state-capital background of LittlePatch lent political legitimacy for Sinopharm-RedFlag to fund the establishment of TDAC. By contrast, the dominant presence of American pharmaceutical giants in the ADHD medication market precluded the possibility of funding a comparable national-level professional association.

Only with the establishment of TDAC could LittlePatch then be officially recognized and recommended as one of the first-line prescriptions for treating TD, as inscribed in the 2017 *Consensus* for TD. This institutional validation enabled LittlePatch to finally realize its substantial growth potential and carve out a considerable niche in this previously untapped market for TD medications. Priced at 166 RMB for a week's supply, LittlePatch has overshadowed all other TD medications in terms of both annual revenue and growth rate. Despite beginning from a modest base, by 2022-2023, LittlePatch has amassed an annual revenue of 97.31 million RMB, with an impressive average year-over-year growth rate of 29.39% from 2017 to 2023, as shown in chart 1. This growth notably outpaced that of its ADHD counterparts, Concerta (27.79%) and Strattera (17.75%), as shown in chart 2.³⁹

³⁹ Illustrated in Chart 1 and Chart 2.

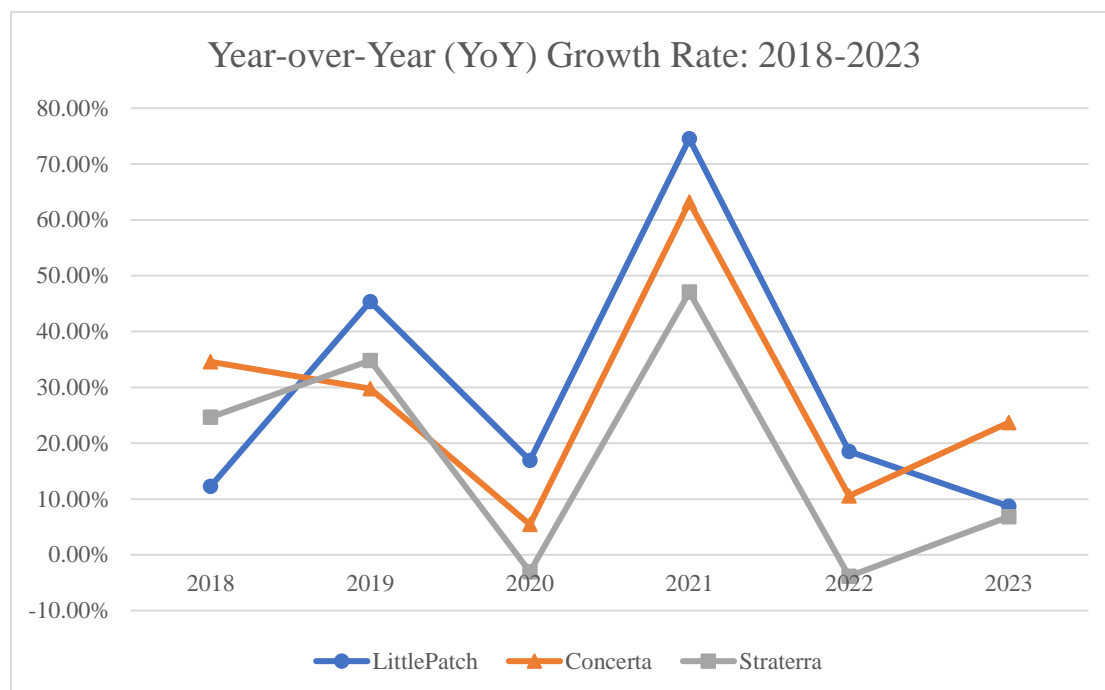


Chart 2

The remarkable ascent of LittlePatch in the market thus became a model of state capital's successful ventures in proactively blending state and private capital. A special report in the State-owned Assets Report Magazine underscored Sinopharm's pioneering efforts in the mixed ownership reform, presenting RedFlag as a prime example of its pioneering strategy,⁴⁰ "The mixed-ownership model can cure many 'illnesses' in SOE reforms," an executive from Sinopharm Investment metaphorically told journalists in an interview:

⁴⁰ State-owned Assets ("国资" in Chinese) can also be translated into "State Capital" in English. The "State-owned Assets Report" (monthly) debuted in October 2014 as a publication focused on enterprise technological reform and development. It is supervised by the State-owned Assets Supervision and Administration Commission (SASAC) of the State Council and co-hosted by the News Center of the SASAC and the China Economic Publishing House.

For years, RedFlag, now a subsidiary of Sinopharm Investment, was mired in continuous losses and considerable challenges. The implementation of mixed-ownership reform turned the tide for RedFlag by introducing strategic investors that fundamentally altered its business operations. This strategic shift not only revitalized the company but also reversed its losses, propelling it into a phase of rapid growth. This ensured the preservation and appreciation of state-owned assets. (State-owned Assets Report Magazine, Issue 7, 2022)

To conclude, before the Xi era, the entrenched biomedical knowledge of ADHD, marked by relatively high diagnosis and established pharmaceutical prescriptions, fostered a dispersed and fragmented network of professionals across various pediatric departments and a drug market dominated by medications of American capital. These conditions hindered the coordination of national-level initiatives by professionals and blocked domestic pharmaceutical companies from developing indigenous ADHD medications, thereby precluding the formation of a nationwide professional association for ADHD during the Xi era.

By contrast, the contested biomedical knowledge of TD at the time, marked by lower diagnosis and a lack of effective biopharmaceutical prescriptions, facilitated a cohesive and tight-knit network of professionals within pediatric neurology and a nascent drug market. These conditions laid the foundation for professionals to establish a top-down structured association and enabled Sinopharm-RedFlag to develop LittlePatch as an indigenous innovative drug. Consequently, this groundwork paved the way for the establishment of TDAC during the Xi era.

3. Epilogue: “Upholding Fundamental Principles and Breaking New Ground.”

The 2022 Annual Conference of TDAC embodied the theme of “*upholding fundamental principles and breaking new ground*,”⁴¹ resonating with the directive set forth by President Xi at the 20th CPC National Congress. At the conference wrap-up, leading committee members of the association shared their interpretations of this directive.

Dr. Xingming Jin, the pioneer of developmental-behavioral pediatrics in China, was invited to the conference predominantly comprised of pediatric neurologists. She summarized as the representative of the medical professionals,

I believe that every specialty should collaborate to tackle and conquer TD. Today's conference exemplifies the principle of “upholding fundamental principles and breaking new ground”. “Fundamental principles”⁴² are normalization, while “breaking new ground”⁴³, in my opinion, is to articulate China's distinct perspective. Any standards of DSM-5 are embedded in its national context. How our national context leads to so many kids with TD undoubtedly correlates with our own cultural fabric, parenting styles, and the environment in which our kids are raised. (2022 Annual Conference of TDAC, recordings)

⁴¹ This corresponds to “shou'zheng chuang'xin” (守正创新) in Chinese.

⁴² This corresponds to “zheng” (正) in Chinese.

⁴³ This corresponds to “chuang'xin” (创新) in Chinese.

Yang Shen, the boss of RedFlag, expanded on the principle with his perspective from the pharmaceutical industry,

I believe that “upholding integrity,” is a kind of morality and justice with warmth and love. The clinical value is the most important. Building on that, we corporations need to commit to our social responsibilities, that is, to implement strategic technologies and integrate such responsibilities into the industry. As practitioners in pharmaceuticals, we need to address patients’ problems in treatment. Many traditional approaches came with pronounced side effects and inconvenience. We then need special mechanisms and approaches to change the release speed and disperse the drug evenly in the body, thus achieving precision medicine. (2022 Annual Conference of TDAC, recordings)

Now the logo of LittlePatch has become a familiar sight in the public outreach activities orchestrated by TDAC, adorning everything from PowerPoint presentations to the attire of participating physicians. To some extent, LittlePatch has become emblematic of TDAC itself, especially when Sinopharm-RedFlag voices its slogan: “Untap the future with love and Stick LittlePatch to every TD-afflicted family with comfort.” The bio-sociotechnical assemblage reflected LittlePatch’s successful enrollment of multiple actors to its TD network (Latour, 1988). The patch has acted beyond its role as a mere medical device, but as a robust network of the innovative development of Chinese scientists, the pioneering clinical trials conducted by Chinese pediatricians, the strategic marketing initiatives by Sinopharm-RedFlag personnel, and finally, the stabilized institutional support by TDAC.

Conclusion and Discussion

This research sheds light on the state's role in driving medicalization and pharmaceuticalization processes. The state's influence is pervasive and multifaceted, as reflected in the distinct organizational structures of different medical conditions. Consequently, it exerts varying influence on individual lives and their daily practices within the field.

The fundamental cause of the institutional disparities between TD and ADHD in China hinges on the necessity of state backing for establishing a centralized, national-scale professional association. TD succeeded due to the state capital behind LittlePatch, whereas ADHD failed because foreign capital has dominated its domestic pharmaceutical market. The formation of associations like TDAC in China is achievable only through collaborations between elite medical professionals in public hospitals and pharmaceutical corporations backed by state investment. In this landscape, neither grassroots-level physicians nor private healthcare providers or foreign pharmaceutical capital, have the capacity to establish such nationwide associations. While state agencies may not directly participate in the actions of these societal actors, the very existence of state power itself matters—its extensive influence operates like a specter that shapes the field within which actors including medical professionals and pharmaceutical corporations can navigate (Bourdieu, 1993), blurring the boundaries between state and society. In this way, the state significantly influences the processes of medicalization and pharmaceuticalization, manifesting in the institutional disparities between TD and ADHD.

The institutional disparities between TD and ADHD are significant, as they exemplify the diverse roles played by the Chinese state as a late developer in different medical conditions. Within

the hierarchical structure of TD, the state acts not only as the innovator behind LittlePatch but also as a beneficiary of the revenue generated by the drug. By contrast, within ADHD's decentralized framework, the state predominantly serves as a regulator and a payer for American pharmaceuticals. Furthermore, the institutional structures profoundly influence the daily activities of individuals within this field through the "many hands of the state" (Morgan & Orloff, 2017). Consequently, this dynamic affects the behaviors and practices of various societal actors, including physicians, corporations, and families impacted by these diagnoses.

A hierarchical TD professional association in China could guide physicians' operations in their daily practice and bring more revenues to the state-invested pharmaceutical corporation, yet not necessarily ensure benefits for those affected. For Chinese physicians, a centralized TDAC could prompt them to be more inclined to prescribe LittlePatch, as shown in the rising revenues of Sinopharm-RedFlag. Moreover, TDAC could steer clinical research towards focusing on TD with the use of LittlePatch, because funding is more accessible from the state-backed corporation. However, this centralized association appears to bring more substantial benefits to state capital than to those affected. As many patients report limited improvement from using LittlePatch, the drug offers little more than elusive hopes of a cure, since no drugs could act as a panacea for tics. The situation is further complicated by the fact that TD medications have not been covered under China's national medical insurance yet, leaving TD-affected families to bear the costs out-of-pocket if they opt for LittlePatch. Ultimately, the establishment of TDAC seems to primarily facilitate the creation of a new market for TD drugs, serving more as a revenue stream for state capital rather than a therapeutic breakthrough for those suffering from TD.

The decentralized organizational structure for ADHD in China does not necessarily equate to

more autonomy for societal actors. Instead, this structure is embedded as part of a broader global hierarchy that centers around DSM-formulated biomedical knowledge and American pharmaceutical capital for ADHD. For Chinese physicians, the absence of a centralized professional association does not permit a wider range of medication options for ADHD. In fact, their prescription options are often limited to either Concerta or Strattera, as these are the medications with “well-established” professional consensus. Moreover, it could be challenging for physicians to conduct clinical research on ADHD with the funding coming from foreign pharmaceutical companies. In an era that emphasizes self-reliance and innovation in the biopharmaceutical sector, there is a noticeable shift towards domestically manufactured drugs across various medical categories, including ADHD. This is exemplified by the fact that Chinese physicians have been increasingly engaging in clinical research with domestic generic ADHD drugs, especially with the expiration of patents for Strattera. For multinational pharmaceutical corporations like J&J, they have been reaping considerable profits in the Chinese market, and this trend will continue in the foreseeable future. A notable milestone is the recent inclusion of J&J's Concerta in China's essential medicines list, covered by basic medical insurance since March 2023. This indicates a potentially lucrative future for ADHD drugs in the country, particularly given the rising medicalization of adult ADHD and a rapidly growing patient base since the 2020s. Nevertheless, with the patents for Strattera expiring and the rise of domestic generic alternatives, the future dynamics of the market and the potential reconfigurations of ADHD's organizational structure remain to be seen.

In conclusion, this study contributes to the field of medical sociology by examining the pharmaceuticalization of TD in China, especially when juxtaposed with ADHD, a typical case of medicalization (Conrad and Potter, 2000). Constituted by illness-professionals of varied knowledge

networks and drug-corporations of distinct capital backgrounds, the institutional disparities between TD and ADHD reveal underlying structural tensions within the healthcare system and pharmaceutical sector. This underscores the nuanced roles of the Chinese state behind the scenes in driving the medicalization and pharmaceuticalization of both diagnoses. This research illustrates how the state's involvement can vary substantially across medical conditions with different expertise networks, thereby shaping the dynamics of medicalization and pharmaceuticalization and the terrains within which societal actors operate.

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Appendix

No.	Name (Pseudo)	TDAC Member	Gender	Region	Interview Format	Position	Department in Pediatrics
1	Yan	Y	F	Shanghai	On-site	Associate Chief Physician	Pediatric Health Care
2	W	N	F	Shanghai	On-site	Chief Physician	Pediatric Traditional Chinese Medicine
3	Q	Y	F	Shanghai	On-site	Associate Chief Physician	Pediatric Neurology
4	Fen	Y	F	Shanghai	On-site	Associate Chief Physician	Pediatric Neurology
5	Nan	N	F	Shanghai	On-site	Attending Physician	Pediatric Neurology
6	Lin	Y	F	Shanghai	On-site	Chief Physician	Pediatric Neurology
7	Gan	Y	M	Shanghai	On-site	Attending Physician	Pediatric Neurology
8	Jing	N	F	Shanghai	On-site	Attending Physician	Pediatric Neurology
9	Lu	Y	F	Shanghai	On-site	Associate Chief Physician	Pediatric Psychiatry
10	Xin	Y	F	Shanghai	On-site	Associate Chief Physician	Pediatric Traditional Chinese Medicine
11	Yun	N	M	Fujian	Online	Associate Chief Physician	Pediatric Neurology
12	Huan	Y	F	Fujian	Online	Associate Chief Physician	Pediatric Psychology & Psychiatry
13	Ye	Y	F	Fujian	Online	Chief Physician	Pediatric Neurology
14	Hua	Y	M	Beijing	On-site	Chief Physician	Pediatric Psychology
15	Ru	Y	F	Sichuan	On-site	Chief Physician	Pediatric Neurology

Table 1: Interview List

No.	Name	Time & Location	Description & Function
1	2023 Annual Meeting of Pediatricians	Zhengzhou June 29, 2023 – July 2, 2023	Hosted by the Chinese Medical Doctors Association, one of China's most prominent medical organizations, the conference provided me with the chance to successfully arrange interviews and informal talks during the Pediatric Neurology venue with three leading committee members of TDAC, including its head.
2	“Sino-US Experts Discussion on New Treatment Plans for ADHD”	Shanghai July 2, 2023	This forum allowed me to observe the discussions of leading experts in the field of ADHD, mostly in Shanghai.
3	The 13th China NCD (non-communicable disease) Management Conference	Beijing July 20-22, 2023	As a significant gathering for chronic illness practitioners in China, this conference granted me the opportunity to observe the central government's directives and interpretation concerning chronic illness management.
4	The 2023 China Brain Health Conference	Beijing July 22, 2023	As the first event in China focusing on brain health, this conference gave me insight into how leading Chinese physicians understand neuro-developmental and psycho-mental issues from a cerebral perspective.
5	The 4th Global Conference & Exhibition on Biopharma Frontier Technology	Suzhou July 11-13, 2023	Featuring a grand marketplace for dealers nationwide, this conference granted me the chance to broadly engage with biotech and biopharma practitioners. These interactions helped me understand how state policies are guiding the pharmaceutical industry towards innovative pursuits, diverging from the conventional track of generic drugs, and the challenges these stakeholders face in the research and development of cutting-edge medications.

6	The Innovative Drugs Launch and Commercialization Forum	Shanghai July 13-14, 2023	As an exclusive summit held at a premier hotel and targeted at top executives from large biopharma giants, this forum provided me with valuable opportunities to comprehend how these high-rank biopharma executives perceived the primary obstacles in the commercialization phase of innovative drugs.
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Table 2: Ethnography List

Table 1. Baseline subject comparison

	Clonidine adhesive patch (n=326)	Placebo adhesive patch (n=111)	p
Age (years)	10.15±2.82	9.89±2.77	0.40
Heart rate (beats min ⁻¹)	81.74±8.79	79.36±9.11	0.12
Systolic BP (mmHg)	98.87±11.80	98.05±11.34	0.52
Diastolic BP (mmHg)	64.97±8.27	64.03±8.52	0.30
Motor tics (total)	15.40±4.67	15.82±4.91	0.36
Vocal tics (total)	5.95±7.11	6.74±6.88	0.29
Symptom severity (CGI)	4.43±1.00	4.60±0.95	
Bodyweight (kg)			
Male (n)	37.97±13.69 (270)	37.44±15.21 (96)	0.75
Female (n)	32.49±10.60 (56)	34.69±10.65 (15)	0.48
Gender, n (%)			
Male	270 (82.77)	96 (86.49)	0.46
Female	56 (17.23)	15 (13.51)	
Nationality, n (%)			
Han people	321 (98.77)	110 (99.10)	1.00
Others	4 (1.23)	1 (0.90)	
Educational background, n (%)			
Kindergarten	21 (6.48)	8 (7.21)	0.78
Primary school	230 (70.99)	79 (71.17)	
Junior high school	61 (18.83)	20 (18.02)	
Senior high school	10 (3.09)	4 (3.60)	
University college	2 (0.62)	0 (0.00)	

BP, blood pressure; CGI, Clinical Global Impression scale.

Table 3

Table 2. Corrected mean YGTSS total score

Days after treatment	Group	Corrected mean ±SE	Comparison of corrected mean	
			F	p
7	Test group (n=326)	17.98±0.29	0.11	0.74
	Control group (n=111)	17.82±0.44		
14	Test group (n=322)	14.74±0.35	0.005	0.95
	Control group (n=111)	14.78±0.54		
21	Test group (n=321)	12.08±0.39	1.89	0.17
	Control group (n=111)	12.97±0.59		
28	Test group (n=280)	9.87±0.43	4.63	0.03
	Control group (n=101)	11.44±0.66		

YGTSS, Yale Global Tic Severity Scale.

Table 4

Table 3. Decreased total raw YGTSS score

Days after treatment	Group	Decreased score	Comparison of decreased score	
			F	p
7	Test group (n=326)	16.46±1.21	0.001	0.97
	Control group (n=111)	16.39±1.85		
14	Test group (n=323)	31.58±1.52	0.02	0.89
	Control group (n=111)	31.21±2.32		
21	Test group (n=321)	43.74±1.67	1.53	0.22
	Control group (n=111)	40.26±2.55		
28t	Test group (n=280)	53.93±1.84	4.00	0.05
	Control group (n=101)	47.70±2.82		

YGTSS, Yale Global Tic Severity Scale.

Table 5