

### 3. Can Network Analysis Capture Connections across Medical Sects? An Examination of Allopathic and Alternative Disability Research in Twentieth-Century Europe and the US

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My research project concerns the international dissemination of a medical network rooted in 1920s Austria. My aim at the outset was to use social network analysis to do a bibliometric or citation analysis to determine the degree to which the network remained intact intellectually after its geographic dispersal. Publications can be a useful way to gauge connections within a network (or the very existence of one) because they are a record of communication between scholars. We can study the way ideas circulate among a group of authors by analyzing the platforms, in the form of journals and presses, that they used to communicate their work. My network is, however, somewhat unusual. I am working on alternative medicine and asking network analysis to do different tasks than those that traditional citation network analysis has accomplished. I hope network analysis can help me see the degree of isolation from the allopathic mainstream that alternative practitioners operated in. I ask whether my data show the boundaries between sects to be as clearly defined as we usually assume them to be, or whether networks of ideas and research trends transcended sectarian boundaries. In the process, I engage an ongoing discussion about the advantages and pitfalls we as researchers encounter when we reduce the complexity of humanistic research in order to produce

the unambiguous questions and clean data that network analysis requires. Finally, I reflect on whether the data we use in digital humanities research merely illustrates the divide between medical sects or in fact helps to create it.

I begin with an overview of the larger book project to which my network analysis contributes. I then discuss my network analysis process, from the design of the research questions to the building of databases and the construction of network diagrams in Cytoscape. Finally, I conclude with some thoughts on the questions, observations, and next steps that came out of the project.

## **The Research Project**

We are in the midst of a rapid transformation in our understanding of the autism spectrum and other intellectual and developmental disabilities (IDD). Activists with Down syndrome and autism have become powerful voices for a movement that challenges us to view IDD as difference, argues for inclusion, and champions self-determination. Along with this movement has come much scholarly and popular interest in the history of IDD, but the picture that has emerged misses a story crucial to understanding where we are today.

That story begins in April 1939, when nine-year-old Peter Bergel and his parents set out from Amsterdam for a small village in northern Scotland. Jewish refugees from Frankfurt, they had fled to Amsterdam in 1937 and applied for visas to the United States. Scotland was not their first choice. Although his parents were granted US entry, restrictions against “defectives” scuttled Peter’s application.<sup>1</sup> He had contracted encephalitis as a three-year-old and was left with permanent brain damage. His Jewishness and his disability made him a double target in Nazi Germany. In 1933, eugenics legislation mandated forced sterilization of people with disabilities. Within five years, mass killing was sanctioned. The British Home Office granted Peter a visa because his parents found

a doctor in Scotland willing to care for him. In a small village outside Aberdeen, Dr. Karl König, himself a German Jewish refugee, had just secured permission to open Camphill Special School, a residential care village for children with IDD. Peter was to be his first patient.<sup>2</sup>

In an era when the response to disability was shame, blame, and institutionalization, Camphill was founded on the principle that children with IDD could enrich communities and that doctors should abandon the search for cures. König's radical position was rooted in his unusual approach to medicine. He was a follower of the Austrian occult philosopher, Rudolf Steiner, whose ideas spawned alternative medical, educational, and agricultural movements. Steiner began as a Goethe scholar, but soon discovered theosophy and became the leader of the German Theosophical Society. In 1912, he broke off from theosophy to establish his own occult movement. Called anthroposophy, Steiner defined the movement as a philosophy which held that higher, spiritual worlds could be accessed through what he called "spiritual science." Spiritual science was the inner work necessary to develop the tools to understand the spiritual world in a rational, scientific manner. These tools were not the kinds of gadgets that spiritualists used to detect ectoplasm. Rather, the anthroposophical tools for accessing higher worlds were the faculties of perceptive imagination, inspiration, and intuition. In addition to building on theosophy, anthroposophy drew on German idealism and mysticism, as well as Christian theology. Theosophical ideas about the origin of the world in Atlantis and the workings of karma and reincarnation blended with the belief that history is shaped by positive and negative *impulses*. Christ, for example, was understood as an impulse, as was a German or Middle European cultural mission to the world.<sup>3</sup>

König discovered Steiner as a medical student in Vienna. For a few years after his graduation in 1927, he tried to blend research and clinical care in allopathic medical institutions with his anthroposophical approach to medicine. This entailed bringing anthroposophical ideas about spiritual evolution into embryology, and incorporating homeopathy and a spiritual approach to

diagnosis into medical care. Within a year or two, he abandoned the attempt to blend traditions and moved to anthroposophical headquarters in Switzerland. There, he worked at the Clinical Therapeutic Institute in Arleshiem, near Dornach, under Dr. Ita Wegman, the Dutch physician who had co-founded anthroposophic medicine with Rudolf Steiner. König got involved in a growing network of doctors and teachers around Wegman who were interested in *Heilpädagogik* (curative education) for children with disabilities. By 1930, he had married a member of this network and settled in Pilgramshain, lower Silesia, where he established a successful anthroposophic pediatric practice. In 1936, König and his family fled Nazi Germany for Vienna, from which they fled again in 1938 for Scotland, where they established Camphill Special School.<sup>4</sup>

In spite of his unusual credentials, König was able to secure state support and a loan from the Scottish Council for Refugees. This allowed Camphill Special School to grow and establish a network of sister villages. By the 1950s, the network had spread from Scotland to England and Ireland. As the movement grew, it inspired and made connections to sister movements, extending a transnational network of intentional communities caring for people with disabilities.<sup>5</sup> In the 1960s and 1970s, hippies, activists, and conscientious objectors flocked to the villages and started new ones in the UK, North America, Southern Africa, and Central Europe. Camphill became a center of the counterculture. König guided this expansion, serving as the intellectual and spiritual leader of the movement and continuing to publish on IDD and a wide range of other topics until his death in 1966. Today, Camphill includes over 130 communities extending to Eastern Europe, the Middle East, and South and East Asia, and it continues to attract support from prominent artists and public intellectuals.<sup>6</sup> Its story lies at the intersection of some of the defining events and cultural currents of the last century, including mass migrations, the emergence of the counterculture, the rise of alternative medicine, and the growth of the disability rights movement.

Camphill has grown into a global movement, but its story is rooted in the history of medicine in Central Europe. Karl König was part of a generation of Viennese physicians and psychoanalysts working toward new understandings of child development. This group included Hans Asperger, of the eponymous diagnosis; Leo Kanner, who introduced the autism diagnosis; and Bruno Bettelheim, the psychoanalyst who popularized the “frigid mother” theory of autism. The network dispersed in the interwar period, but its members continued to transform the field. Leo Kanner (b. 1894, Klekativ, Austria-Hungary) emigrated to the US in 1924. After four years at the state hospital in Yankton, South Dakota, he moved to Maryland and spent the rest of his career at Johns Hopkins. During the Second World War, Kanner, who was Jewish, helped get hundreds of Jewish physicians out of Nazi Europe. He retired from Johns Hopkins in the early 1970s, but remained active in the field until his death in 1981. Bruno Bettelheim (b. 1903, Vienna, Austria-Hungary) emigrated to the US in 1939 after imprisonment for just under a year in Dachau and Buchenwald. He was also instrumental in getting other Jewish refugee physicians out of Nazi Europe and into positions in the United States. He spent his career as a professor of psychology at the University of Chicago. There is much controversy around Bettelheim, the PhD in Art History which he misrepresented in various ways, his falsification of evidence and plagiarism, and his abuse of students and patients. Much of this controversy came to light after his death in 1990. Hans Asperger remained in Austria, served as a medical officer in Croatia during the Second World War, and resumed his work on autism in Austria after the war until his death in 1980. Under Nazi rule, he modified his analysis of disability to accommodate Nazi ideology and collaborated with the euthanasia program.<sup>7</sup>

The literature on the history of IDD in the US acknowledges, but assigns no particular significance to, the Central European origins of its protagonists.<sup>8</sup> Yet IDD research in interwar Vienna and in Central Europe more broadly drew on an interdisciplinary cultural and intellectual milieu that produced strikingly original and creative

work in science and medicine.<sup>9</sup> To give just one example, all three figures had a serious interest in poetry as students, which they maintained and even published on later in their careers. König also shared this interest.

Against this background, I would like to use network analysis to determine to what degree, if at all, this dispersed group of doctors continued to constitute a medical/intellectual network. This seems like a straightforward undertaking, but it has broad implications. If a network persisted and encompassed both alternative and allopathic practitioners, it would reveal continuities across medical traditions. In line with recent literature that explores and contextualizes what were seen as eccentric, heretical, or simply embarrassing works by great scientists and writers (e.g. Newton's alchemy or Goethe's science), an account of the pioneers of IDD research that includes both allopathic and alternative traditions might not only include new figures, but also previously ignored work.<sup>10</sup> Kanner's first book, for example was *Folklore of the Teeth*.<sup>11</sup>

## **Methodology (or, Trial and Many Errors)**

### **First Attempt**

My first step was to get a sense of the kinds of questions that network analysis is well suited to answer, as well as a basic command of the field's vocabulary.<sup>12</sup> Then, to tackle my question about the degree to which dispersed Austrian IDD doctors continued to constitute a medical/intellectual network, I decided to start with an analysis of each figure's publications. A problem presented itself immediately: the bibliographies turned out to be vastly different in length and character.

After a handful of articles on embryology in allopathic journals early in his career, König worked exclusively with anthroposophic publishers. And once he made this shift, he became tremendously prolific, publishing over 520 articles and books on a wide variety

of topics including disability, curative education, folklore, animals, history of medicine, and spirituality. Even after I culled publications in newsletters and material printed for use within the Camphill movement, König's 496 entries dwarfed Bettelheim's 204, Kanner's 133, and Asperger's 27.

These numbers reveal the difficulty of running comparisons across sects. Kanner and Bettelheim published under similar conditions and in the same professional context, broadly speaking, so a comparison of their works pulled from American library databases rendered a fairly reliable basis for comparison. Adding König made the comparison lopsided. It is safe to hazard that König's vastly longer bibliography reflects the fact that he became the leader of a spiritual movement. His followers have gone to great lengths to publish everything he wrote, however short or informal. There may also be duplicates in the list, as texts were sometimes edited and reprinted under new titles when older versions went out of print. Moreover, Asperger's contrasting short bibliography may also be misleading. I generated it based on data from the Austrian and German National Libraries but will have to follow footnotes in the literature to determine whether this is complete. My impression is that it is not.

Setting these concerns aside for the moment, I built a database of publications for each figure to use as the basis for a bimodal edge list consisting of titles and publishers, with an additional column of tags for each publication identifying its primary field and/or topic, and color coding to indicate the years in which texts were published. I hoped to use these edge lists to create visualizations that would show where and on which topics each figure was publishing and reveal change over time through color coding. I had a vague notion of producing something sort of like a citation index visualization.





**Table 3.1: Database of König's works**

<b>Year</b>	<b>Title</b>	<b>Journal/ Publisher</b>	<b>Citation Details</b>	
1932	The Being of Man and the Festivals	Anthroposophy	vol. 7	no. 4
1933	On the Illness of our Time Encephalitis and Angina pectoris	Anthroposophy	vol. 8	nos. 3/4
1932	Der Mensch und die Jahresfeste	Arbeiten aus dem Heil- und Erziehungsinstitut Schloss Pilgramshain	Paper 1	August 1932
1966	Music Therapy in Curative Education	Aspects of Curative Education		
1964	Denken – Schauen – Sinnen. Ein Hinweis auf die letztthin erschienenen	Bände der Schriftenreihe		
1954	Versuch einer geisteswissenschaftlichen Theorie der im Electro-Encephalo-gramm erscheinenden Phänomene	Beiträge	vol. 7	no. 1
1950	Der dreifache Eisenprozess im Menschen	Beiträge	vol. 2	nos. 7/8
1951	Die Bedeutung des Kosmischen Eisens im Menschen	Beiträge	vol. 3	nos. 9/10
1952	Buchbesprechung: M.M. Moncrieff The Clairvoyant Theory of Perception	Beiträge	vol. 4	nos. 7
1952	Zum Problem der kindlichen Taubheit	Beiträge	vol. 4	nos. 9/10
1953	Eugen Kolisko Im Gedenken an den Freund	Beiträge	vol. 6	nos. 11/12
1955	Die Nerventätigkeit kann nur durch eine Methode der Ausschlüssung erfasst werden	Beiträge	vol. 8	nos. 3/4
1955	Samuel Hahnemann und seine Zeit	Beiträge	vol. 8	nos. 1

**Table 3.2: Bimodal edge list of König's works**

<b>Title</b>	<b>Journal/ Publisher</b>
Superintendent's Report, 31st January 1952-31st January 1955	
Über schwere Kontaktstörungen im Kindesalter und deren Behandlung mit der Substanz Thalamos	Der Merkurstab
Die menschenkundlichen Grundlagen des Rechnens	???????
The Human Soul	?????
The Foundation Stone	?????
An Inner Journey through the Year: Soul Images and the Calendar of the Soul	Floris Books
The Calendar of the Soul	Floris Books
Becoming Human: A Social Task	Floris Books
Communities for Tomorrow	Floris Books
At the Threshold of the Modern Age: Biographies Around the Year 1861	Floris Books
Brothers and Sisters: The Order of Birth in the Family	Floris Books
Kasper Hasuer and Karl König	Floris Books
Animals: An Imaginative Zoology	Floris Books

Cytoscape and the result was a huge visualization. It is essentially a series of balls of different sizes, which is helpful in as much as it is clear at a glance which journals and presses published the bulk of König's work. And if one zooms in and looks at titles, one can begin to get a sense of the topics on which he published with each journal or press. The color coding was largely unsuccessful; I picked one color per decade but, because the publications covered 10 decades, the differences between shades of color had to be too slight to distinguish easily. Also, each node was too small to see without zooming in so far that only a few points could be seen together.

Table 3.3: Node list of König's works

Title	Year
Superintendent's Report, 31st January 1952–31st January 1955	1955
Über schwere Kontaktstörungen im Kindesalter und deren Behandlung mit der Substanz Thalamos	2007
Die menschenkundlichen Grundlagen des Rechnens	2002
The Human Soul	2006
The Foundation Stone	2002
An Inner Journey through the Year: Soul Images and the Calendar of the Soul	2010
The Calendar of the Soul	2010
Becoming Human: A Social Task.	2011
Communities for Tomorrow	2011
At the Threshold of the Modern Age: Biographies Around the Year 1861	2011
Brothers and Sisters: The Order of Birth in the Family	2012
Kaspar Hauser and Karl König	2012
Animals: An Imaginative Zoology	2013

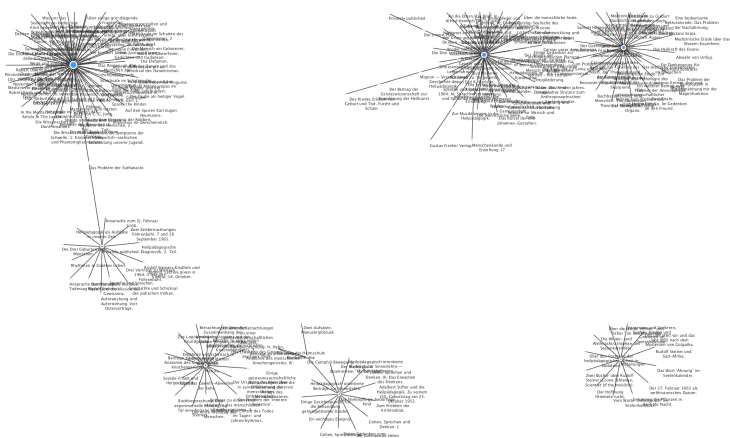


Figure 3.2: Bimodal visualization of König's works

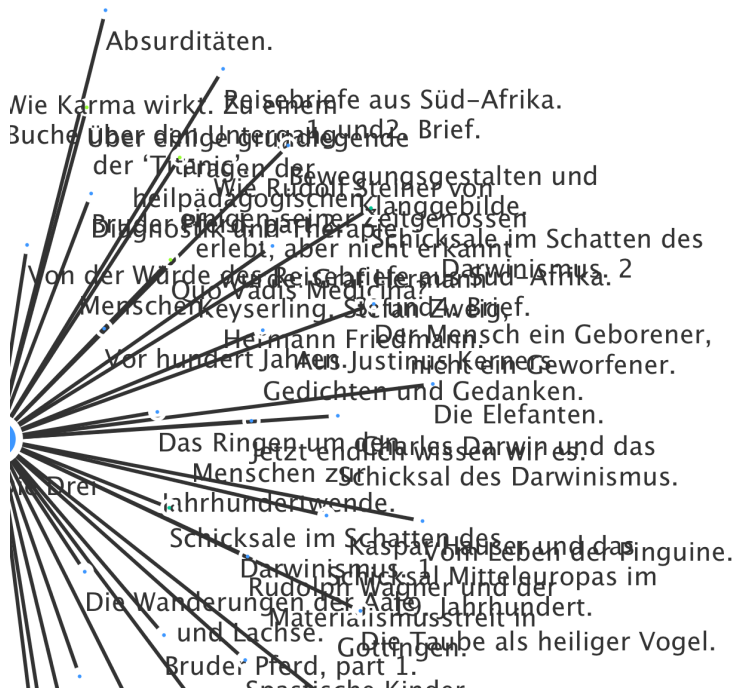


Figure 3.3: Bimodal visualization of König's works

I had done some reading on the potential hazards of bimodal networks and how attempting to measure centrality in them can be misleading.<sup>14</sup> I thus followed Miriam Posner's tutorial on converting bimodal edge lists into unimodal ones.<sup>15</sup> This involved downloading R and RStudio, following the tutorial, doing some troubleshooting, and making some mistakes (like unnecessarily converting an Excel spreadsheet into a CSV file, which threw off the whole process). I uploaded the finished unimodal edge list to Cytoscape and ended up with a visualization that, frankly, didn't tell me anything new.

It was fun learning a little bit about R and getting a sense of the possibilities for more advanced network analysis, but I was unsure what to do next. Simply repeating the process for my other three key figures was not going to get me very far in understanding



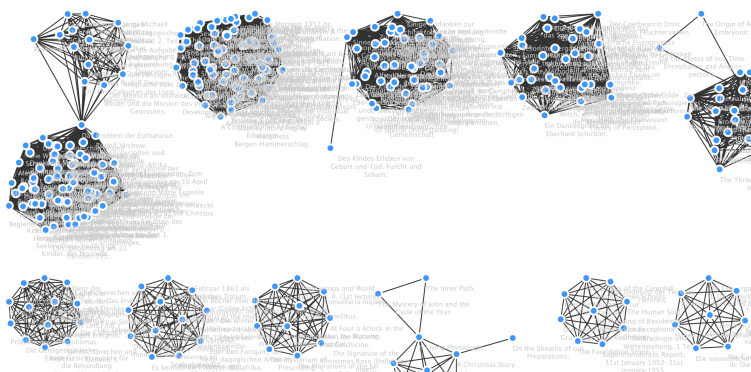


Figure 3.6: Unimodal visualization of König's work

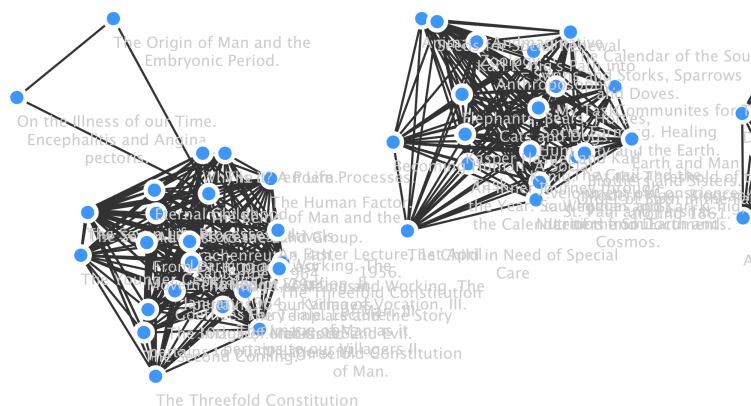


Figure 3.7: Unimodal visualizations of König's work

## Second Attempt

In my first attempt I had aimed for a visualization that was too complicated and was supposed to illustrate too many different things: year, publisher, topic, and change over time. The literature on network analysis also makes clear that this is a typical mistake. Most humanists, when they first begin working with network

analysis, try to make visualizations that show too much. We tend to be reluctant to let go of complexity and we resist the necessity to break questions down into very basic, component parts.<sup>16</sup> In fact, my experience was not so much that I was worried about obscuring complexity, but that I was not used to breaking questions down into components well suited to network analysis or to using sources as data. It is simply conceptually foreign for me to take apart a bibliographic reference and to discard parts of it irrelevant to an edge list. As a cultural and intellectual historian, I am not used to using my sources as data points.

Ultimately, I realized that I could do a series of discrete analyses using bibliographic data in order to answer the various questions about the strength and character of the network I am studying. But for now, a first step toward illustrating whether my four figures were part of a professional network or not involved simply illustrating the overlap (or lack thereof) in publishers among the four authors. If they shared publishers, I could infer that they were writing for some of the same audiences and they were recognized as authorities on a shared set of fields by the editors and peer reviewers who accepted their work. This required one edge list that included all four authors and the presses and journals they published with. Titles and years were irrelevant to this one, discrete visualization.<sup>17</sup>

Before creating this edge list, I had to finish building databases for all four key figures. I made one each for works by Leo Kanner, Bruno Bettelheim, and Hans Asperger, covering their early work in Vienna through their careers in the UK and the US. I then cleaned up the databases, creating consistent entries for data pulled from various libraries with different referencing conventions and in different languages. As noted above, I was left with a lopsided dataset. I was working with comprehensive lists of Karl König's publications, which included privately published manuscripts, pamphlets, and lectures printed for circulation in the Camphill movement. Thus my database of over 520 items for König was more than twice the size of the others combined. To combat this problem, I eliminated all works

by König that were privately published as well as articles published by individual Camphill communities, keeping only articles published in books and journals.

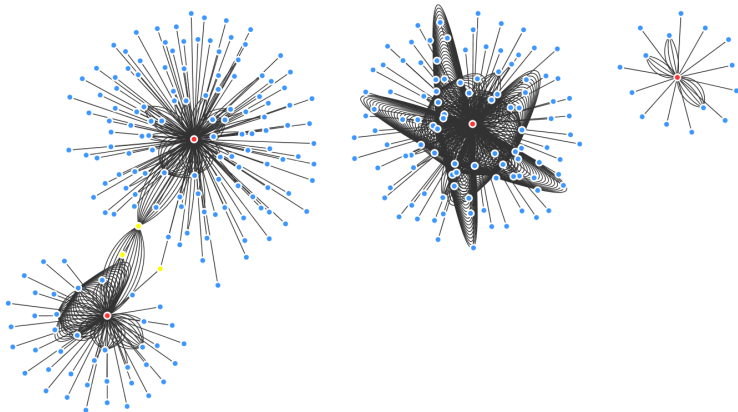


Figure 3.8: Combined visualization of all authors' works

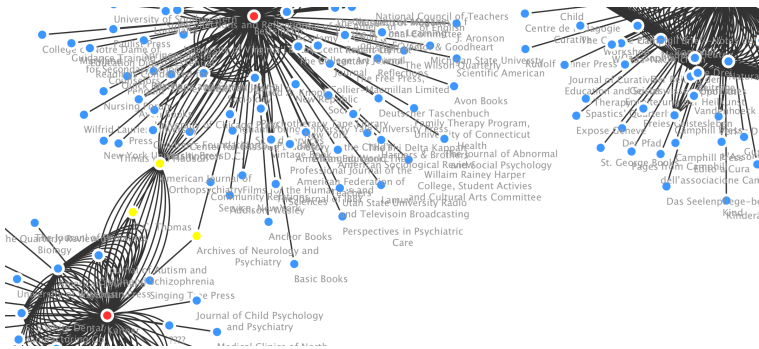


Figure 3.9: Close-up of combined visualization of all authors' works

Table Panel	
Shared Name:	Name:
American Journal of Orthopsychiatry	American Journal of Orthopsychiatry
Archives of Neurology and Psychiatry	Archives of Neurology and Psychiatry
C.C. Thomas	C.C. Thomas



As the visualizations illustrate, all four figures were relatively isolated from one another as measured by publishers. Kanner and Bettelheim were connected by two journals and one press: *American Journal of Orthopsychiatry*, *Archives of Neurology*, and C. C. Thomas (each represented by a yellow node in figure 3.9). Asperger and König had no publication links to anyone else. This tells me that the four figures were not part of a publication network in Vienna before three of them emigrated. Bettelheim and Kanner both published in major journals, but Bettelheim tended to publish in more social scientific venues, such as the *American Journal of Sociology* and *The Elementary School Journal*, whereas Kanner tended to stay more strictly within medicine, publishing in the *Journal of Pediatrics* and the *American Journal of Psychiatry*. This reflects their training: Bettelheim's was in Philosophy and Art History while Kanner's was in medicine. And the fact that König is not the only one isolated in this visualization suggests that, in my focus on the question of divisions between medical sects, I had been overlooking the importance of geography. Kanner and Bettelheim worked with a few of the same publishers, not only because they had similar research interests and operated in the same medical sect but also because both worked in the American academy. Even if there had been more fluidity between medical sects, it is unlikely that König would have shared publishers with Kanner and Bettelheim; most of his work came out in British, Swiss, and German journals and books. And Asperger published exclusively in German. Nevertheless, I remain surprised by the complete lack in overlap at the beginning of their careers, when they were all in Vienna. This suggests that I should pay more attention to divisions at the University of Vienna, which was famously fractured in the interwar period.

The diagram clearly illustrates divisions more than connections, and I wondered whether narrowing the dataset to show only the journals and presses in which each author published most would reinforce or weaken that finding. I narrowed the edge list to include only those journals and presses with which authors published five

or more works (see below). Two things stood out. First, the shared publishers (represented by the yellow nodes) remained in the leaner diagram, which shows that the professional network linking Bettelheim and Kanner was perhaps tighter than the previous diagram seems to suggest. Second, the disparity in the number of publications between König and the other three figures is more accurate and apparent. His network diagram dwarfs those of the other three. Again, this is misleading, because the diagram cannot represent the vastly different professional culture and publication conventions within which the four figures worked.

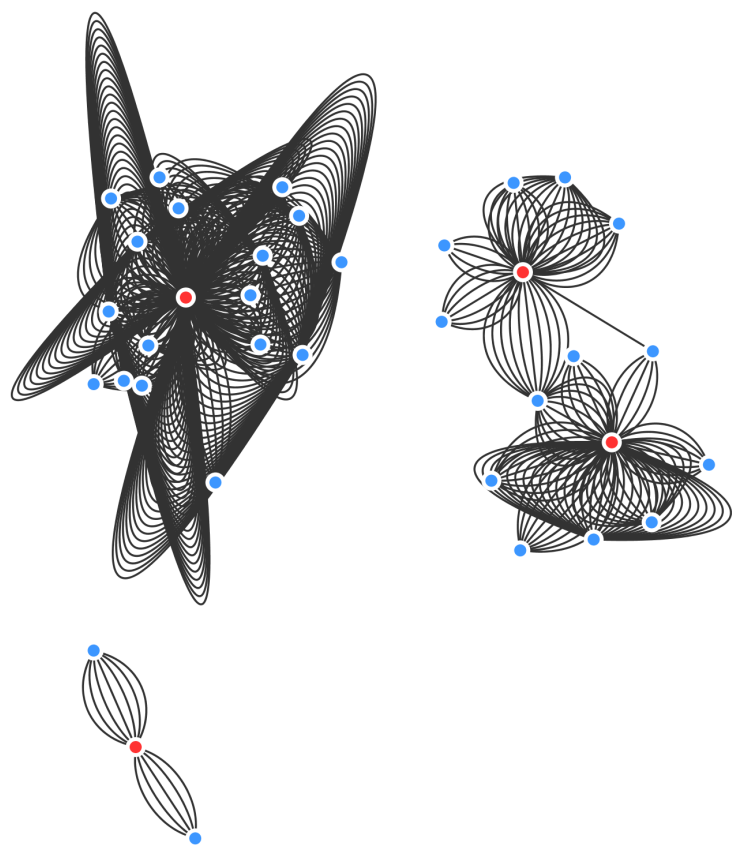
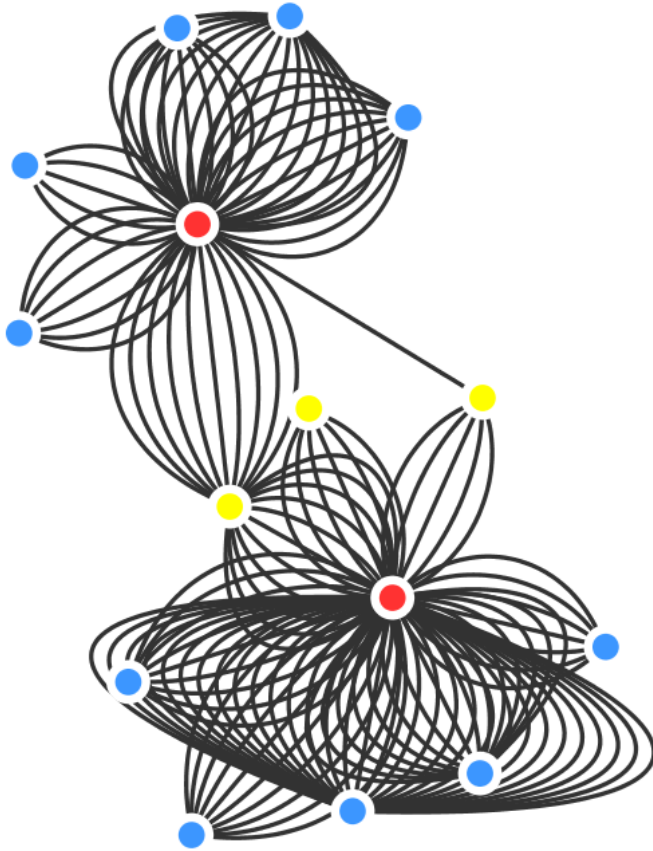


Figure 3.10: Overview of visualizations of dataset reduced to presses and journals with which authors published five or more texts



*Figure 3.11: Close-up visualizations of dataset reduced to presses and journals with which authors published five or more texts*

## Conclusions

I have learned that a) designing a network analysis project involves working backward from complex questions to simple, discrete ones; and b) the only way to learn to do this is through trial and error. For

example, I had begun with what I thought was a suitable question: do chosen publication topics and publication venues illustrate the existence of a network among four figures, and does the strength of the network change before and after emigration? I first broke this down to ask: what is the degree of overlap in four figures' publication venues before and after emigration? At this stage, I left publication titles in, failing to recognize that they were, essentially, clutter. Finally, I ended up with the question: to what extent, if any, did four figures publish in the same venues?

This has been a very helpful process. It has forced me to think of each component part of large and complex questions, questions that I had assumed were simple and discrete. It has helped me realize that I often give short shrift to pieces of evidence that I see as obvious. My visualizations do not reveal something that I couldn't have correctly guessed by sorting and reading through bibliographic databases I created for each figure. But I can now demonstrate the professional isolation between my four figures concretely, rather than simply anecdotally. In the process, I have had to slow down and think more about how that isolation came about and what it means, which in turn has added more depth to my research.

Finally and most importantly, this first network analysis project has raised new questions. For example, would a citation analysis or even a full-text analysis of all four figures' work reinforce König's and Asperger's isolation, or might it reveal a shared set of concerns among some or all of the figures, which they explored in different professional contexts? Such projects would undoubtedly advance my project, but I can already anticipate more problems posed by the attempt to transcend medical sects. I also anticipate new concerns about what my visualizations miss or obscure.<sup>18</sup> Finally, the practical obstacles remain. I cannot use existing databases to search for citations. I know from traditional, close-reading and archival research that König cited Asperger and that Asperger referenced König in a conference talk. The only way to build a citation edge list would be to search full texts.

In conclusion, network analysis offers a basis from which to discuss my key figures' relationships and the ways in which they are situated in a broader context, but the methods traditionally used to visualize professional and intellectual networks are not well equipped to work across disciplinary and national boundaries. In order to move forward with this project, I will need to rethink the questions I ask with the complexity and unevenness of my source base in mind.

## **Acknowledgments**

I would like to thank Tom Ewing for organizing an excellent workshop and for insightful feedback on my work, Jeffrey Reznick for hosting us at NLM, Nathaniel Porter for consultation on the design of networks to be analyzed, and Katherine Randall for skillful stewardship of the revision process and for editing. I am also grateful to my fellow contributing scholars, especially Sarah Runcie and Nicole Archambeau, for helpful feedback on drafts. Finally, I thank the institutions which supported this project and my participation in it: the National Institutes of Health, the National Endowment for the Humanities, and Virginia Tech.

## Endnotes

1. Douglas Baynton, *Defectives in the Land: Disability and Immigration in the Age of Eugenics* (Chicago: University of Chicago Press, 2016).

2. On Peter Bergel's escape from Nazi Germany and his life in Camphill, see Alan Potter, "Intentional Community as a Continuing Response to the Holocaust: The Life of Peter Bergel and the Camphill Communities," published by Camphill Community Botton Village (n.d.).

3. Peter Staudenmaier offers a summary of key anthroposophical ideas and beliefs in his study of anthroposophy under Nazism. See Peter Staudenmaier, *Between Occultism and Nazism: Anthroposophy and the Politics of Race in the Fascist Era* (Leiden: Brill, 2014).

4. Karl König and Peter Selg, *My Task: Autobiography and Biographies* (Edinburgh: Floris Books, 2008), Hans Müller-Wiedermann, *Karl König: A Central European Biography of the Twentieth Century* (Botton Village, Malton, UK: Camphill Books, 1996).

5. In 1964, Jan Vanier, a Canadian Catholic, visited a Camphill community in North Yorkshire, England and went on to found L'Arche, a movement that operates on very similar principles to Camphill. Strong ties continue to exist between two movements. In 2015, Vanier won the Templeton Prize, which honors exceptional work in spiritual matters. He was nominated by John Swinton, a professor in the Divinity School at the University of Aberdeen who has also done work on (and commissioned by) Camphill. For Camphill's characterization of the influence on Vanier, see *Camphill Pages* (newsletter of the Association of Camphill Communities UK and Ireland), Spring, 2015. For Vanier's Templeton Prize announcement, including commentary by Swinton, see <http://www.templetonprize.org/previouswinners/vanier.html> (accessed May 23, 2018). For Swinton's work on Camphill, see John Swinton, Aileen Falconer, and Stephanie Brock, "Sensing the Extraordinary within the Ordinary: Understanding the Spiritual Lives of People Living and Working within Camphill Communities," a work commissioned by the Camphill Village Trust and funded by them with contributions from the Anthroposophical Medical Trust and Camphill Medical Practice Ltd (n.d.).

6. Friedwart Bock, ed. *Builders of Camphill: Lives and Destinies of the Founders* (Edinburgh: Floris Books, 2004).

7. Herwig Czech, "Hans Asperger, National Socialism, and 'Race Hygiene' in Nazi-era Vienna," *Molecular Autism* 9, no. 29 (2018), doi: <https://doi.org/10.1186/s13229-018-0208-6>; Edith Sheffer, *Asperger's Children: The Origins of Autism in Nazi Vienna* (New York: W. W. Norton, 2018). On all three figures, see Steve Silberman, *NeuroTribes: The Legacy of Autism and the Future of Neurodiversity* (New York: Avery, 2015), John Donvan and Caren Zucker, *In a Different Key: The Story of Autism* (New York: Broadway Books, 2016), Adam Feinstein, *A History of Autism: Conversations with the Pioneers* (West Sussex: Blackwell, 2010).

8. Their research and perspectives were connected from the start through shared influences. See John E Robison, "Kanner, Asperger, and Frankl: A Third Man at the Genesis of the Autism Diagnosis," *Autism* 21, no. 7 (2016): 1-10.

9. See Karl Schorske, *Fin-de-siècle Vienna: Politics and Culture* (New York: Knopf, 1979); Deborah Coen, *Vienna in the Age of Uncertainty: Science, Liberalism, and Private Life* (Chicago: University of Chicago Press, 2007); Eric Kandel, *The Age of Insight: The Quest to Understand the Unconscious in Art, Mind, and Brain, from Vienna 1900 to the Present* (New York: Random House, 2012).
10. See, for example, Sarah Dry, *The Newton Papers: The Strange and True Odyssey of Isaac Newton's Manuscripts* (Oxford: Oxford University Press, 2014).
11. Leo Kanner, *Folklore of the Teeth* (Detroit: Singing Tree Press, 1928).
12. My discussion below gets into detail, so familiarity with those basics will be helpful. For a brief and very accessible overview, see Scott Weingart, "Demistifying Networks," Scottbot (blog), accessed May 23, 2018, <http://www.scottbot.net/HIAL/index.html?p=6279.html>.
13. Stephen Carley, et al., "Visualization of Disciplinary Profiles: Enhanced Science Overlay Maps," *Journal of Data and Information Science* 2, no. 3 (2017), doi: <https://doi.org/10.1515/jdis-2017-0015>.
14. See Scott Weingart's discussion here: "Networks Demystified 9: Bimodal Networks," Scottbot (blog), January 21, 2015, accessed July 16, 2018, <http://www.scottbot.net/HIAL/index.html?p=41158.html>.
15. See "Get a Unimodal Network from a Bimodal Network," Github, June 30, 2016, accessed July 16, 2018, [https://github.com/miriamposner/cytoscape\\_tutorials/blob/master/get-a-unimodal-network.md](https://github.com/miriamposner/cytoscape_tutorials/blob/master/get-a-unimodal-network.md).
16. Miriam Posner, "Digital Humanities 101: Network Analysis," *Digital Humanities 101* (blog), accessed May 23, 2018, <http://miriamposner.com/classes/dh101f16/tutorials-guides/data-visualization/network-analysis/>.
17. I'd like to thank Nathaniel Porter for helping get me to this point.
18. Some of the texts are on sensitive topics connected to disability and the Holocaust. For a discussion of the ethical implications of doing computational analysis of such work, see Todd Presner, "The Ethics of the Algorithm: Close and Distant Readings of the Shoah Foundation's Visual History Archive," *History Unlimited: Probing the Ethics of Holocaust Culture*, eds. Claudio Fogu, Wulf Kansteiner, and Todd Presner (Cambridge: Harvard University Press, 2015), 175–202.