

Conceptualizing Convergence

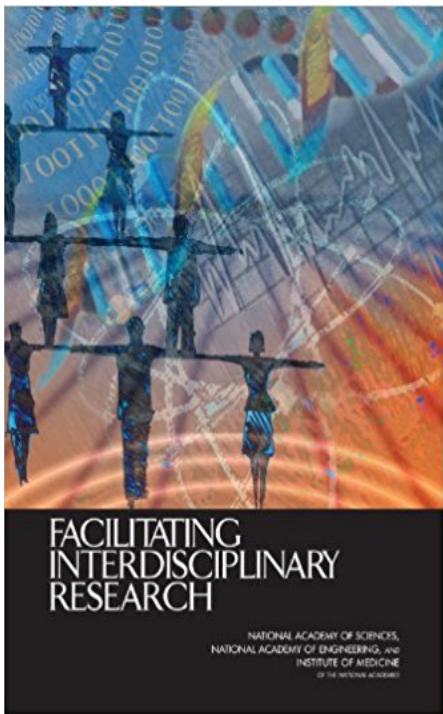
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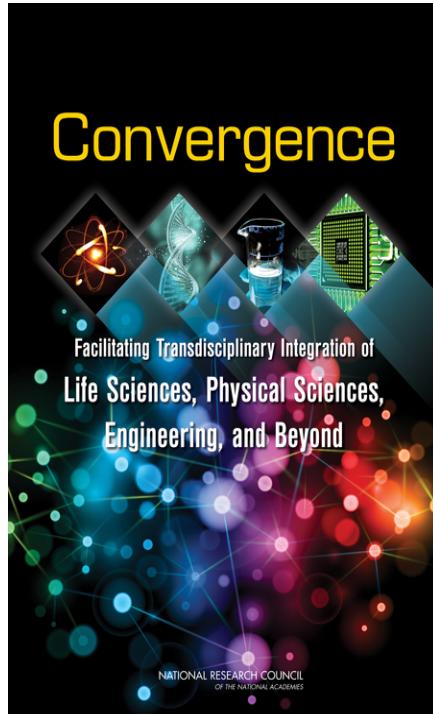
*Virtual Workshop on the Implications of Convergence for How the National Center for
Science and Engineering Statistics Measures the Science and Engineering Workforce
National Academies of Science, Engineering and Medicine
Washington, DC
October 23, 2020*

Convergence

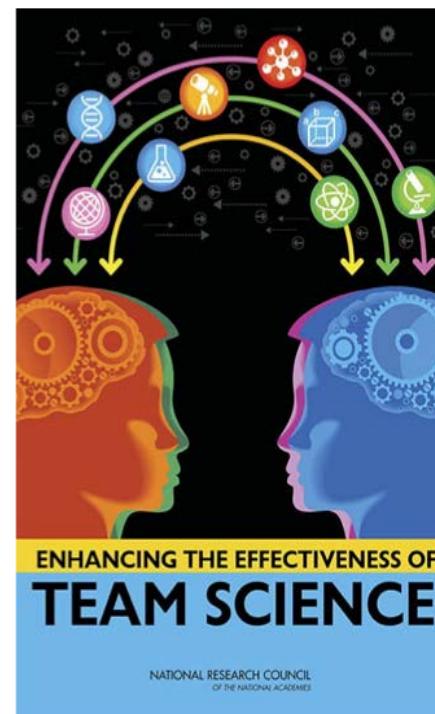
A National and Global Priority



(2005)



(2014)



(2015)



(2019)

Hallmarks of Convergent Research

- *Involves deep integration across disciplines and perspectives situated beyond academia*
- *Driven by a specific and compelling problem*
- *Often leads to co-production of knowledge by researchers and diverse stakeholder groups*

(cf., <https://www.nsf.gov/od/oi/convergence/index.jsp>)

Global Challenges of the 21st Century

- Environmental



- Public Health



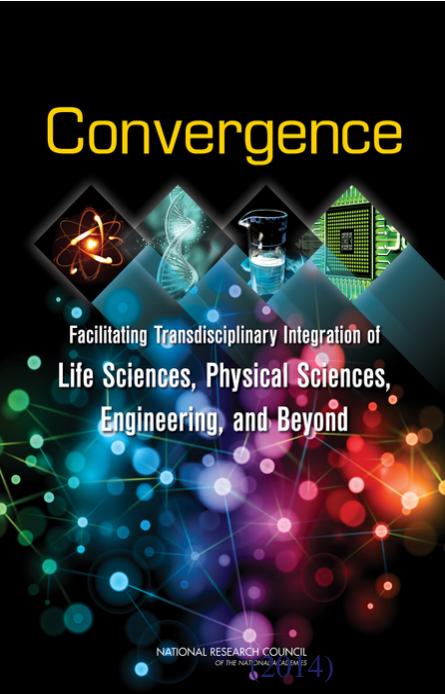
- Sociocultural



- Technological



Changing Conceptions of Convergence

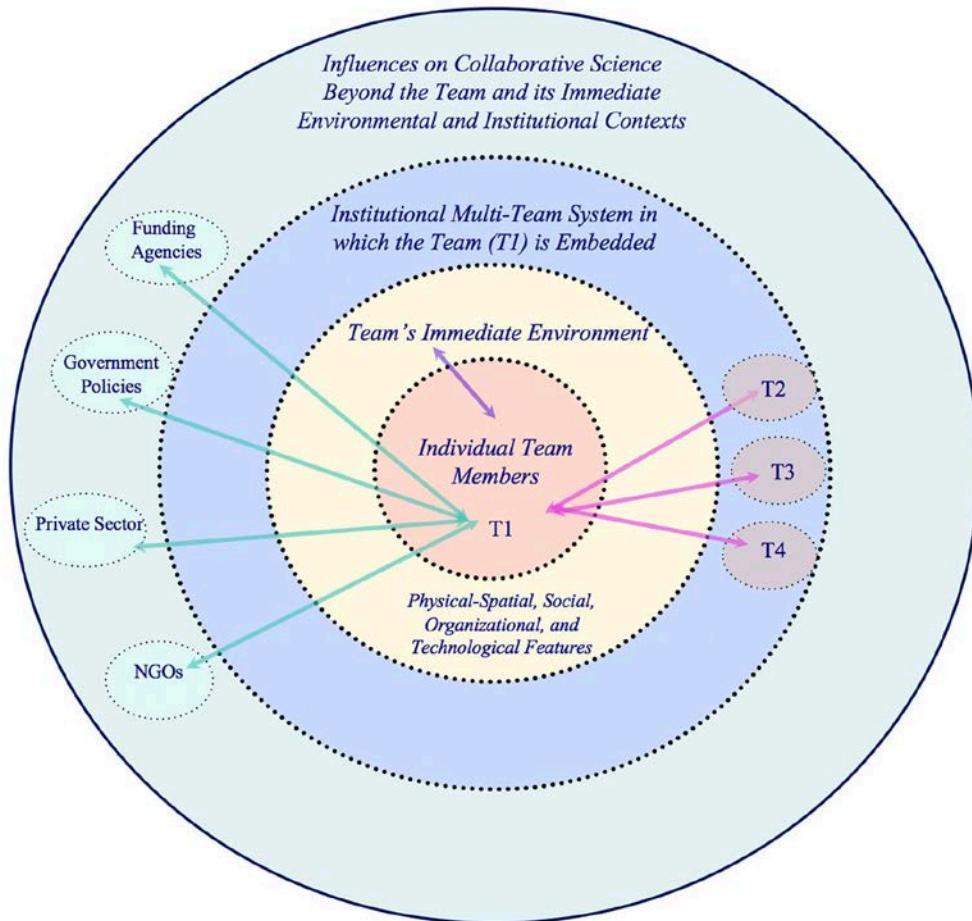


- *Broader cross-disciplinary and trans-epistemic scope, spanning academic fields and sectors beyond academia*
- *Greater emphasis on integrating the concerns and tools of transdisciplinary collaboration and convergence*
- *Explicit consideration of strategies for creating a culture of convergence in research organizations*
- *Closer look at the interplay between divergent and convergent thinking in research teams*
- *Emerging questions about the impact of macro-societal forces on convergence (proximity constraints imposed by Covid-19; cyber chaos; nationalistic, anti-science values and policies)*



PROCEEDINGS OF A WORKSHOP

Key Facets of the Convergence Ecosystem



(Stokols, 2019; Stokols, Olson, Salazar, & Olson, 2019)

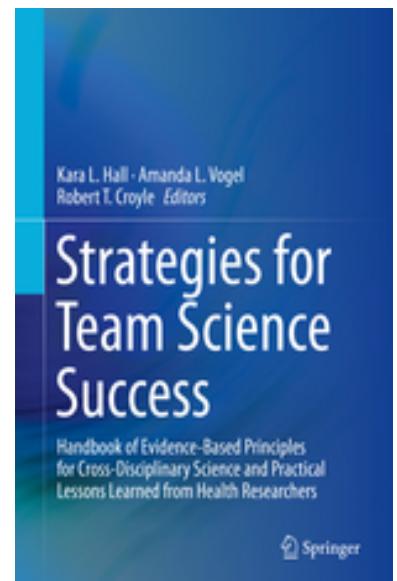
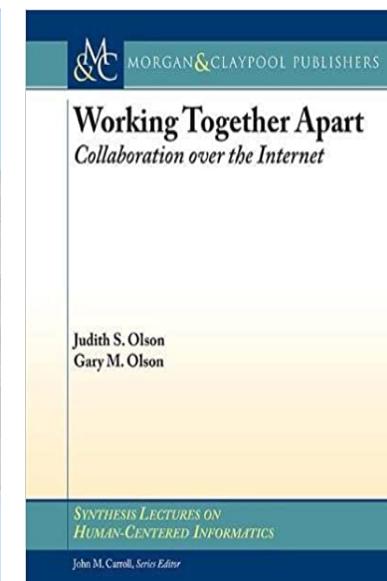
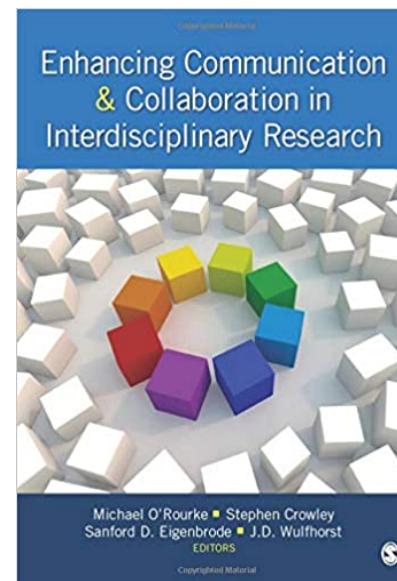
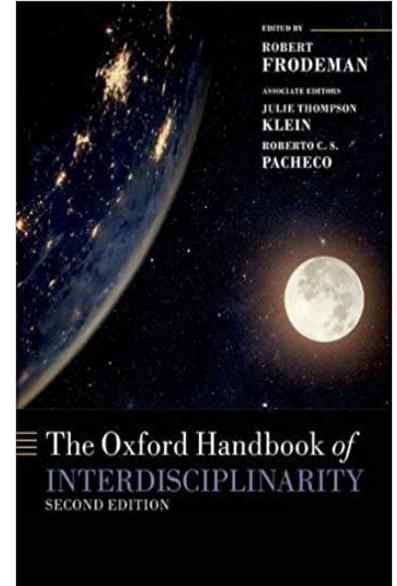
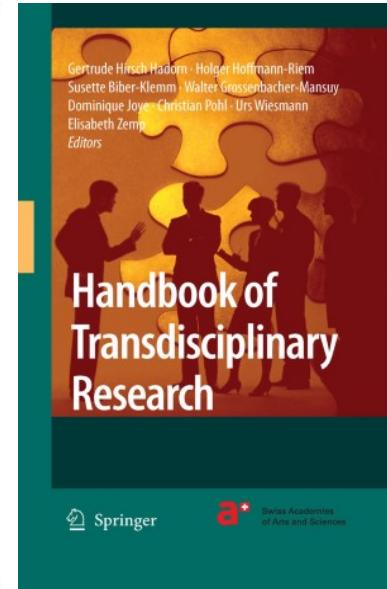
- *Societal events; national research policies; funding agency & foundation support for team science initiatives; pandemics, public opinion*
- *Institutional incentives for cross-disciplinary partnerships (e.g., seed grants, credit sharing, promotion and tenure criteria)*
- *Team-level supports (team assembly, collaboration planning; funding, technological and environmental resources)*
- *Cultivating collaborative and integrative competencies- individual and team training strategies*

The Science of Team Science

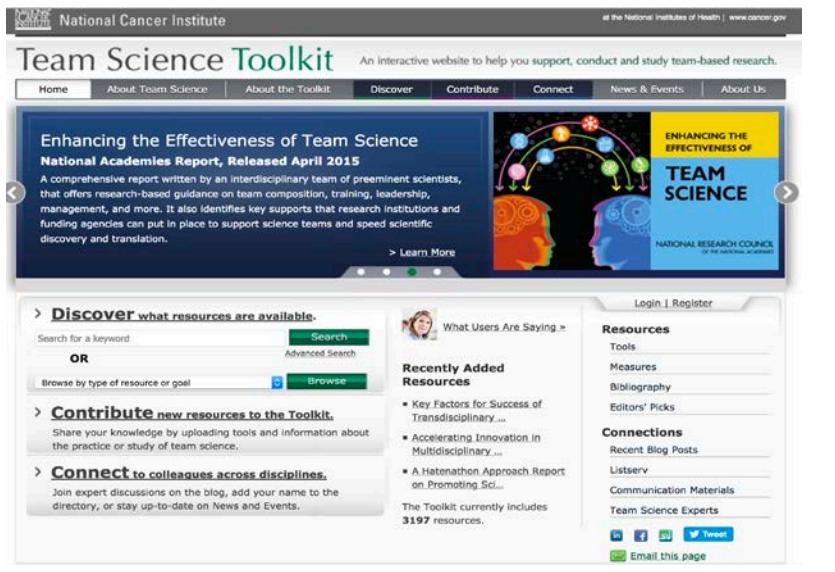
...an interdisciplinary field concerned with understanding and managing circumstances that facilitate or hinder the effectiveness of collaborative (and often cross-disciplinary) research, training, and translational initiatives



<https://www.inscits.org/>



Resources for Convergence Training and Practice



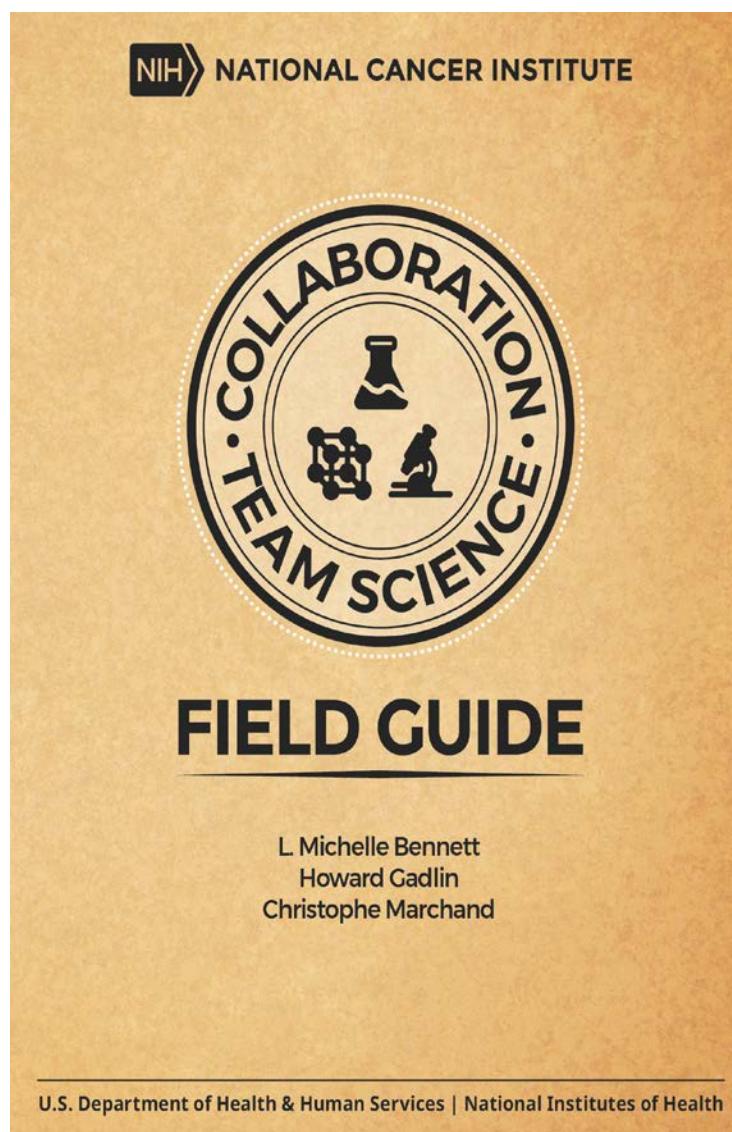
The screenshot shows the homepage of the National Cancer Institute Team Science Toolkit. The header includes the National Cancer Institute logo and the text "Team Science Toolkit" and "An interactive website to help you support, conduct and study team-based research." The main content area features a banner for the "Enhancing the Effectiveness of Team Science National Academies Report, Released April 2015". Below the banner are sections for "Discover what resources are available", "Contribute new resources to the Toolkit", and "Connect to colleagues across disciplines". A sidebar on the right contains links for "Login | Register", "Resources" (Tools, Measures, Bibliography, Editors' Picks), "Connections" (Recent Blog Posts, Listserv, Communication Materials, Team Science Experts), and social media links. The footer includes a "3197 resources" count and an "Email this page" button.

<https://www.teamsciencetoolkit.cancer.gov>



The screenshot shows the homepage of the Team Scholarship Acceleration Lab (TSAL) at UCI. The header features the TSAL logo and the text "TEAM SCHOLARSHIP ACCELERATION LAB". The main content area features a large image of stylized human figures connected by a network of lines, with the text "Team Scholarship at UCI" overlaid. Below the image is a paragraph of text explaining the challenges of assembling teams and the purpose of the site as a guide to making such efforts more successful.

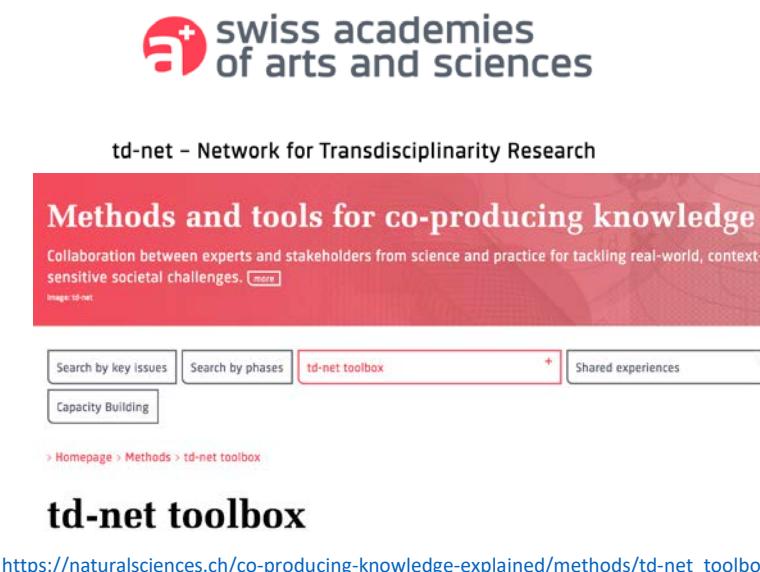
<https://tsal.uci.edu/>



The screenshot shows the homepage of the Dialogue Initiative Toolbox. The header features the text "TOOLBOX" and "DIALOGUE INITIATIVE™". Below the header is a photograph of a group of people in a meeting. The footer includes the website URL "http://tdi.msu.edu/" and a link to "http://tdi.msu.edu/workshops/".

<http://tdi.msu.edu/>

<http://tdi.msu.edu/workshops/>



The screenshot shows the homepage of the td-net toolbox. The header features the Swiss Academies of Arts and Sciences logo and the text "td-net – Network for Transdisciplinarity Research". Below the header is a red banner with the text "Methods and tools for co-producing knowledge". The main content area includes a paragraph about collaboration, a "td-net toolbox" button, and a "Capacity Building" button. The footer includes a "Search by key issues" button, a "Search by phases" button, a "td-net toolbox" button, a "Shared experiences" button, and a "Capacity Building" button. The footer also includes a "Homepage" link and a "Methods > td-net toolbox" link.

https://naturalsciences.ch/co-producing-knowledge-explained/methods/td-net_toolbox

Convergence in the Covid Era

- Fostering Intellectual Synergy
- Promoting Social Integration

Pre-Covid, spatial proximity and environmental supports were considered essential for sustaining intellectual and interpersonal integration in research teams. How will reduced colocation of team members in the Covid era affect the convergent capacity of research teams and centers? What new competencies for convergence research will become imperative in the Covid era?



(<https://i2insights.org/2019/03/12/idea-tree-brainstorming-tool>)



(Kabo, Hwang, Levenstein, & Owen-Smith, 2013; Stokols, 2011)

Cultivating Core Competencies for Convergence

The Four T's of Research Training in the 21st Century

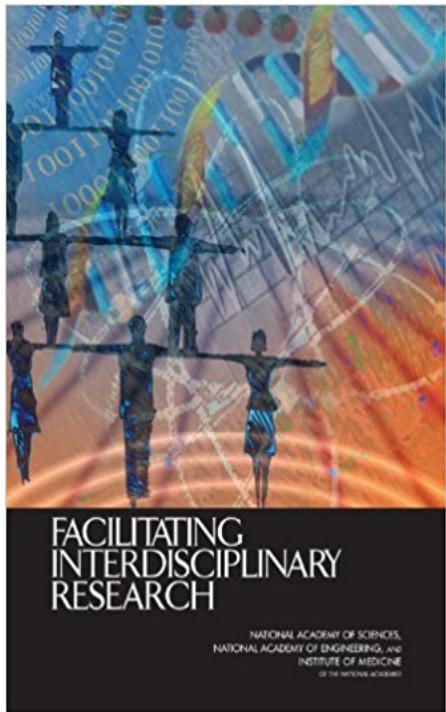
- *Transdisciplinary*
- *Team-based*
- *Translational*
- *Transcultural*



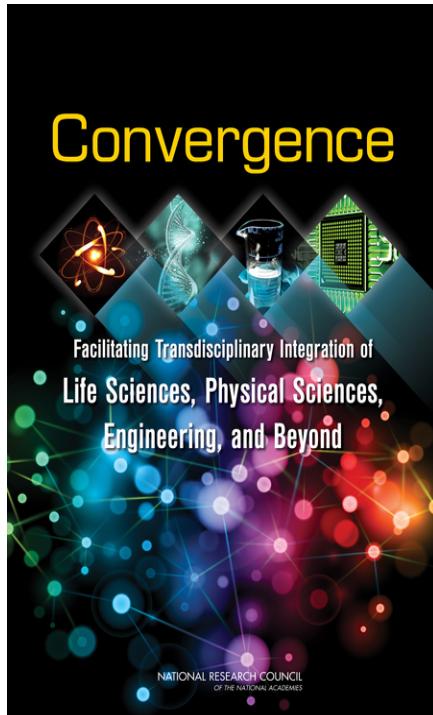
Members of the ALICE Collaboration, A Large Ion Collider Experiment

Convergence

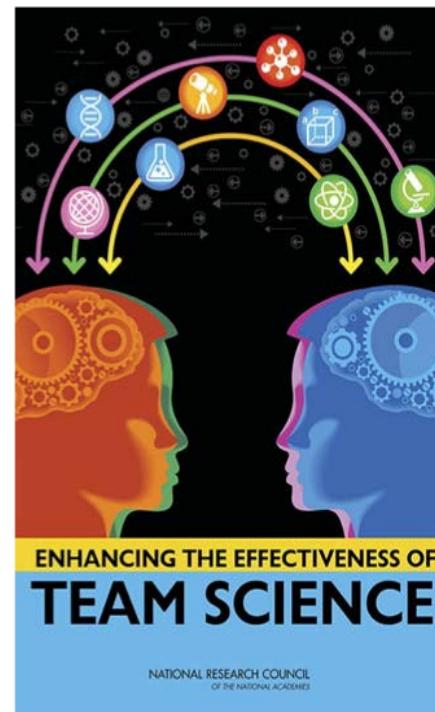
Questions for the Future



(2005)



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(20XX)

- Standardized or context-dependent definitions & criteria of convergence?
- Key competencies for co-producing knowledge spanning multiple fields & societal sectors?
- Can we transcend spatial, sociocultural, & geo-political constraints on convergence?