

## Publications

### Journal Articles

- Röthlisberger, M., & Frick, A. (2020). Development of stereo vision in young infants. *Infancy*, *25*, 781-796. DOI: 10.1111/infa.12359
- Pedrett, S., Kaspar, L., & Frick, A. (2020). Understanding of object rotation between two and three years of age. *Developmental Psychology*, *56*, 261-274. DOI: 10.1037/dev0000871
- Frick, A. (2019). Spatial transformation abilities and their relation to later mathematics performance. *Psychological Research*, *83*, 1465-1484. DOI: 10.1007/s00426-018-1008-5 <https://rdcu.be/LbPo>
- Möhring, W., Ishihara, M., Curiger, J., & Frick, A. (2019). Spatial-numerical associations in first-graders: Evidence from a manual-pointing task. *Psychological Research*, *83*, 885-893. DOI: 10.1007/s00426-017-0904-4
- Möhring, W., Frick, A., & Newcombe, N. S. (2018). Spatial scaling, proportional thinking, and numerical understanding in 5- to 7-year-old children. *Cognitive Development*, *45*, 57-67. DOI: 10.1016/j.cogdev.2017.12.001
- Frick, A., & Baumeler, D. (2017). The relation between spatial perspective taking and inhibitory control in 6-year-old children. *Psychological Research*, *81*, 730-739. DOI: 10.1007/s00426-016-0785-y
- Möhring, W., Newcombe, N. S., & Frick, A. (2016). Using mental transformation strategies for spatial scaling: Evidence from a discrimination task. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *42*, 1473-1479. DOI: 10.1037/xlm0000240
- Frick, A., & Möhring, W. (2016). A matter of balance: Motor control is related to children's spatial scaling and proportional reasoning skills. *Frontiers in Psychology*, *6*:2049. DOI: 10.3389/fpsyg.2015.02049
- Möhring, W., Newcombe, N. S., Levine, S. C., & Frick, A. (2016). Spatial proportional reasoning is associated with formal knowledge about fractions. *Journal of Cognition and Development*, *17*, 67-84. DOI: 10.1080/15248372.2014.996289
- Frick, A., & Newcombe, N. S. (2015). Young children's perception of diagrammatic representations. *Spatial Cognition & Computation*, *15*, 227-245. DOI: 10.1080/13875868.2015.1046988
- Möhring, W., Newcombe, N. S., & Frick, A. (2015). The relation between spatial thinking and proportional reasoning in preschoolers. *Journal of Experimental Child Psychology*, *132*, 213-220. DOI: 10.1016/j.jecp.2015.01.005
- Frick, A., Möhring, W., & Newcombe, N. S. (2014). Development of mental transformation abilities. *Trends in Cognitive Sciences*, *18*, 536-542. DOI: 10.1016/j.tics.2014.05.011
- Frick, A., Möhring, W., & Newcombe, N. S. (2014). Picturing perspectives: Development of perspective-taking abilities in 4- to 8-year-olds. *Frontiers in Psychology*, *5*:386. DOI: 10.3389/fpsyg.2014.00386
- Möhring, W., Newcombe, N. S. & Frick, A. (2014). Zooming in on spatial scaling: Preschool children and adults use mental transformations to scale spaces. *Developmental Psychology*, *50*, 1614-1619. DOI: 10.1037/a0035905
- Frick, A., & Wang, S. (2014). Mental spatial transformations in 14- and 16-month-old infants: Effects of action and observational experience. *Child Development*, *85*, 278-293. DOI: 10.1111/cdev.12116
- Frick, A., Hansen, M. A., & Newcombe, N. S. (2013). Development of mental rotation in 3- to 5-year-old children. *Cognitive Development*, *28*, 386-399. DOI: 10.1016/j.cogdev.2013.06.002

- Frick, A., Ferrara, K., & Newcombe, N. S. (2013). Using a touch screen paradigm to assess the development of mental rotation between 3½ and 5½ years of age. *Cognitive Processing*, *14*, 117-127. DOI: 10.1007/s10339-012-0534-0
- Frick, A., & Möhring, W. (2013). Mental object rotation and motor development in 8- and 10-month-old infants. *Journal of Experimental Child Psychology*, *115*, 708-720. DOI: 10.1016/j.jecp.2013.04.001
- Möhring, W., & Frick, A. (2013). Touching up mental rotation: Effects of manual experience on 6-month-old infants' mental object rotation. *Child Development*, *84*, 1554–1565. DOI: 10.1111/cdev.12065
- Frick, A., & Newcombe, N. S. (2012). Getting the big picture: Development of spatial scaling abilities. *Cognitive Development*, *27*, 270-282. DOI: 10.1016/j.cogdev.2012.05.004
- Newcombe, N. S., & Frick, A. (2010). Early education for spatial intelligence: Why, what, and how. *Mind, Brain, and Education*, *4*, 102-111. DOI: 10.1111/j.1751-228X.2010.01089.x
- Frick, A., Daum, M. M., Walser, S., & Mast, F. W. (2009). Motor processes in children's mental rotation. *Journal of Cognition and Development*, *10*, 18-40. DOI: 10.1080/15248370902966719
- Frick, A., Daum, M. M., Wilson, M., & Wilkening, F. (2009). Effects of action on children's and adults' mental imagery. *Journal of Experimental Child Psychology*, *104*, 34-51. DOI: 10.1016/j.jecp.2009.01.003
- Ebersbach, M., Luwel, K., Frick, A., Onghena, P., & Verschaffel, L. (2007). The relationship between the shape of the mental number line and familiarity with numbers in 5- to 9-year old children: Evidence for a segmented linear model. *Journal of Experimental Child Psychology*, *99*, 1-17. DOI: 10.1016/j.jecp.2007.08.006
- Frick, A., Huber, S., Reips, U.-D., & Krist, H. (2005). Task-specific knowledge of the law of pendulum motion in children and adults. *Swiss Journal of Psychology*, *64*, 103-114. DOI: 10.1024/1421-0185.64.2.103

### Book Chapters

- Newcombe, N. S., Möhring, W., & Frick, A. (2018). How big is many? Development of spatial and numerical magnitude understanding. In A. Henik & W. Fias (Eds.), *Heterogeneity of Function in Numerical Cognition* (pp. 157-176). San Diego: Academic Press. DOI: 10.1016/B978-0-12-811529-9.00009-1
- Frick, A. (2018). Perspective taking. In M. H. Bornstein (Ed.), *The SAGE Encyclopedia of Lifespan Human Development* (pp. 1627-1628). Thousand Oaks: SAGE Publications. DOI: 10.4135/9781506307633.n609
- Lourenco, S. F., & Frick, A. (2013). Remembering where: The origins and early development of spatial memory. In P. J. Bauer and R. Fivush (Eds.), *Wiley-Blackwell Handbook on the Development of Children's Memory*, Volume I/II, John Wiley & Sons Ltd, Chichester, UK. DOI: 10.1002/9781118597705.ch16
- Frick, A., Bächtiger, M. T., & Reips, U.-D. (2001). Financial incentives, personal information and drop-out in online studies. In U.-D. Reips & M. Bosnjak (Eds.), *Dimensions of Internet Science* (pp. 209-220). Lengerich: Pabst.

### Doctoral Thesis

- Frick, A. (2005). *Entwicklung dynamischer Vorstellungen: Zum Einfluss visueller und sensumotorischer Information auf die mentale Representation bewegter Ereignisse. [Development of dynamic imagery: Effects of visual and sensory-motor information on mental representations of physical events.* Dissertation [online], University of Zürich, Switzerland. Available: <http://www.dissertationen.uzh.ch>

### Master's Thesis

- Frick, A., Huber, S., Reips, U.-D., & Krist, H. (2001b). *Virtuelle Pendel - realistische Vorstellung? Wissen über elementare Bewegungsgesetze bei Kindern und Erwachsenen. [Virtual pendulums - realistic imagery? Children's and adults' knowledge about basic dynamic laws.]* Unpublished Master Thesis, University of Zürich, Switzerland.

## Proceedings & Short Reports

- Möhring, W., Ishihara, M., & Frick, A. (2016). Interaction between space and number representations in 1st-graders. In M. Hegarty, C. Hölscher, D. Montello, & N. S. Newcombe (Eds.), *Proceedings of the Spatial Cognition Conference* (pp. 12-15). Philadelphia, USA.
- Frick, A., Daum, M. M., Walser, S., & Mast, F. W. (2005). Developmental changes in the interference of motor processes with mental rotation. In B. G. Bara, L. Barsalou, M. Bucciarelli (Eds.), *Proceedings of the CogSci2005 XXVII Annual Conference of the Cognitive Science Society* (pp. 720-725). Stresa, Italy.
- Daum, M., & Frick, A. (2004). Cognitive effects on representational momentum: The role of knowledge about the intention of an object. *Perception, 33(Supplement)*, 165.
- Frick, A., Huber, S., Reips, U.-D., & Krist, H. (2001a). Alltagswissen über Pendelschwingungen: ein Altersvergleich. In A. C. Zimmer, K. Lange, et al. (Eds.), *43. Tagung experimentell arbeitender Psychologen* [CD-ROM]. Regensburg: Universitätsbibliothek.
- Frick, A., Bächtiger, M. T., & Reips, U.-D. (1999). Financial incentives, personal information and drop-out rate in online studies [preliminary version]. In U.-D. Reips, B. Batinic, W. Bandilla, M. Bosnjak, L. Gräf, K. Moser, & A. Werner (Eds.), *Current Internet science – trends, techniques, results. Aktuelle Online Forschung – Trends, Techniken, Ergebnisse* [WWW document]. Zürich: Online Press. Available URL: <http://dgof.de/tband99/>

## Presentations

### Invited Talks

- Frick, A. (2019). *Les changements liés à l'adolescence et leurs implications pour la cognition, le comportement et l'éducation. [Changes in adolescence and their implications for cognition, behavior, and education.]* University of Fribourg, CH, Nov. 28, 2019.
- Frick, A. (2019). *Devine ce que je vois: Développement de la prise de perspective. [Guess what I see: Development of perspective taking abilities.]* University of Geneva, CH, June 19, 2019.
- Frick, A. (2018). *Mental transformation abilities and math performance.* University of Lancaster, UK, Dec. 12, 2018.
- Frick, A. (2018). *Development of mental representations & mathematical abilities.* Department of Psychology, University of Konstanz, DE, Feb. 5, 2018.
- Frick, A. (2017). *Development of spatial and numerical skills.* iscience research colloquium. Department of Psychology, University of Konstanz, DE, Nov. 22, 2017.
- Frick, A. (2017). *Entwicklung von räumlichen Vorstellungen und mathematischem Denken. [Development of spatial imagery and mathematical thinking.]* Collegium Generale, Münchenwiler Seminar. Imagination: Erkenntnisfortschritt in den Wissenschaften. Münchenwiler, CH, March 31, 2017.
- Frick, A. (2016). *Development of spatial and numerical skills.* Department of Psychology, Stockholm University, Sweden, Sept. 21, 2016.
- Frick, A. (2015). *Entwicklung Dynamischer Repräsentationen. [Development of dynamic representations.]* University of Graz, AT, Nov. 26, 2015.
- Frick, A. (2015). *Spatial transformation abilities predict later math and geometry: A longitudinal study.* Space and Mathematics: What's the connection? Conference Sponsored by the Spatial Intelligence Learning Center (SILC), University of Chicago, Chicago, US, Nov. 17-18, 2015.
- Frick, A. (2015). *What do infants know – and how do we know it?* LEAD Lecture Series, Tübingen, DE, May 11, 2015.
- Frick, A. (2015). *The Origin of Abstract Thought: Geometry - Discussion.* Invited talk, Nijmegen Lectures of the Max Planck Institute for Psycholinguistics and the Radboud University Nijmegen, NL, Feb. 25-27, 2015.
- Frick, A. (2014). *Einfluss motorischer Aktivität auf räumliche Kognition. [Influence of motor activity on spatial cognition.]* International Symposium on Multisensory Perception, Regensburg, DE, Sept. 26, 2014.

- Frick, A. (2011). *The Early Development of Mental Rotation Abilities*. School of Natural Sciences, University of Stirling, Scotland, Nov. 24, 2011.
- Frick, A. (2010). *Development of Spatial Transformation Abilities*. Swiss National Science Foundation, Bern, CH, June 22, 2010.
- Frick, A. (2010). *Einfluss motorischer Aktivität auf mentale Rotation. [Influence of motor activity on mental rotation ability.]* Department of Psychology, Ernst Moritz Arndt Universität Greifswald, DE, June 8, 2010.
- Frick, A. (2010). *Entwicklung mentaler räumlicher Transformationen. [Development of spatial transformation abilities.]* Kognitive & Developmental Psychology, University of Zurich, CH, June 2, 2010.
- Frick, A., (2009). *Development of Mental Rotation and Effects of Motor Activity*. Department of Psychology, Rutgers University, Camden, NJ, USA, Sept. 25, 2009.
- Frick, A., Wang, S. (2009). *Mental Rotation in 14- and 16-month-olds*. Colloquium Cognitive Psychology, University of California Santa Cruz, Santa Cruz, CA, USA, April 13, 2009.
- Frick, A. (2008). *Development of Mental Imagery*. Department of Psychology, University of Chicago, Chicago, IL, USA, Nov. 13, 2008.
- Frick, A. (2007). *Spatial Thinking and Embodied Cognition in Children and Adults*. Department of Psychology, Temple University, Philadelphia, PA, USA, Sept. 6, 2007.
- Frick, A. (2007). *Effects of Motor Activity on Mental Representations in Children and Adults*. Colloquium Cognitive Psychology, University of California Santa Cruz, Santa Cruz, CA, USA, May 9, 2007.
- Frick, A. (2004). *Intuitives Wissen über dynamische physikalische Vorgänge. [Intuitive knowledge about dynamic physical events.]* Developmental Psychology, Justus-Liebig-Universität Giessen, DE, Nov. 10, 2004.

### **Selected Presentations**

- Kubik, V., & Frick, A. *Multitasking abilities in 7- to 10-year-old children*. Biennial Meeting of the Cognitive Development Society, Louisville, KY, USA, Oct. 17-19, 2019.
- Frick, A., & Kubik, V. *Spatial abilities explain temporal monitoring of multiple tasks: Testing the spatio-temporal hypothesis in children*. Biennial Meeting of the Cognitive Development Society, Louisville, KY, USA, Oct. 17-19, 2019.
- Kubik, V., & Frick, A. (2019). *Development of multitasking abilities in middle childhood*. Joint Conference of the DGP Sections Developmental Psychology & Educational Psychology, Leipzig, Sept. 9-12, 2019.
- Frick, A., & Kubik, V. (2019). *Multitasking abilities between 7 and 10 years of age*. 16<sup>th</sup> Conference of the Swiss Society for Psychology (SGP/SSP), Bern, Switzerland, Sept. 9-11, 2019.
- Möhring, W., & Frick, A. (2019). *Associations between Mental Rotation and Fraction Knowledge in Children*. 16<sup>th</sup> Conference of the Swiss Society for Psychology (SGP/SSP), Bern, Switzerland, Sept. 9-11, 2019.
- Röthlisberger, M., & Frick, A. (2018). *The role of stereo vision and 3D presentation on infants' mental object rotation*. Talk. International Conference on Spatial Cognition. Rome, IT, Sept. 10-15, 2018.
- Pedrett, S., Tschachtli-Heiniger, R., & Frick, A. (2018). *Mental rotation below age 4: Evidence from a new mirror-image discrimination task*. Poster presented at the Spatial Cognition Conference. Tübingen, DE, Sept. 5-8, 2018.
- Röthlisberger, M., & Frick, A. (2018). *Infants' mental rotation and recognition of 3D objects – the relevance of stereovision*. Poster presented at the 60th Conference of Experimental Psychologists (TeaP), Marburg, DE, March 11-14, 2018.
- Röthlisberger, M., & Frick, A. (2017). *Emerging stereopsis and its relation to infants' 3D object recognition and mental rotation*. Poster presented at the Biennial Meeting of the Cognitive Development Society, Portland, OR, USA, Oct. 12-14, 2017.
- Möhring, W., Ishihara, M., & Frick, A. (2016). *Interaction between space and number representations in 1<sup>st</sup>-graders*. Talk. Spatial Cognition Conference. Philadelphia, USA, Aug. 2-5, 2016.
- Frick, A., Möhring, W. (2016). *Spatial abilities are related to an understanding of proportions and formal fractions*. Tagung experimentell arbeitender Psychologen, Heidelberg, Germany, March 21-23, 2016.

- Möhring, W., & Frick, A. (2015). *Spatial abilities are related to formal fraction knowledge: The role of geometric and proportional understanding*. Talk. 13th Congress of the Swiss Society for Psychology (SGP/SSP), Geneva, CH, Sept. 8-9, 2015.
- Möhring, W., & Frick, A. (2015). *Early effects of motor experience on infant's mental rotation*. Talk. 14th European Congress of Psychology (ECP), Milano, Italy, July 7-10, 2015.
- Frick, A., Möhring, W., & Newcombe, N. S. (2015). *Spatial abilities predict later mathematics achievement: A longitudinal study*. Talk. Biennial Meeting of the Society for Research in Child Development, Philadelphia, PA, USA, March 19-21, 2015.
- Frick, A., Bergamo, N., Newcombe, N. S., & Möhring, W. (2014). *Mentale Rotation bei 4,5- und 6-Jährigen: Ein Vergleich von prospektiven und retrospektiven Aufgaben und die Rolle des visuell-räumlichen Arbeitsgedächtnisses*. Talk. 49. Kongress der Deutschen Gesellschaft für Psychologie (DGPs), Bochum, DE, Sept. 22-25, 2014.
- Frick, A., Bayard, J. E., & Roebers, C. M. (2014). *Mental rotation and working memory capacity in 7-year-old children*. Poster presented at the Spatial Cognition Conference, Bremen, Germany, Sept. 15-19, 2014.
- Baumeler, D., Roebers, C. M., & Frick, A. (2013). *The relation between spatial perspective taking and inhibitory abilities in 6-year-old children*. Poster presented at the European Conference on Developmental Psychology, Lausanne, Switzerland, Sept. 3-7, 2013.
- Möhring, W., Newcombe, N. S., Levine, S. C., & Frick, A. (2013). *A sense of proportion? Spatial proportional reasoning is associated with formal knowledge about Fractions*. Poster presented at the European Conference on Developmental Psychology, Lausanne, Switzerland, Sept. 3-7, 2013.
- Frick, A., Möhring, W., & Newcombe, N. S. (2013). *Picturing perspectives – the development of perspective-taking abilities in 4- to 8-year-olds*. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Seattle, USA, WA, USA, April 17-20, 2013.
- Möhring, W., Newcombe, N. S., & Frick, A. (2013). *Mental transformation for spatial scaling in 4- and 5-year-olds*. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Seattle, WA, USA, April 17-20, 2013.
- Frick, A., & Möhring, W. (2012). *Effects of manual experience on 4- to 11-month-olds' mental object rotation*. Talk. 5th International Conference on Spatial Cognition: "Space and Embodied Cognition", Rome, Italy, Sept. 4-8, 2012.
- Frick, A., Newcombe, N. S. (2012). *The space between the lines: Young children's understanding of 2D diagrams of 3D objects*. Poster presented at the Spatial Cognition Conference, Seeon, Germany, Aug. 31-Sept. 3, 2012.
- Frick, A., Newcombe, N. S. (2011). *Development of mental rotation in 3- to 5-year-olds*. Poster presented at the VII biennial meeting of the Cognitive Development Society, Philadelphia, PA, USA, Oct. 14-15, 2011.
- Frick, A., Newcombe, N. S. (2011). *Spatial scaling abilities in 3- to 6-year-olds*. Poster presented at the biennial meeting of the Society for Research in Child Development (SRCD), Montreal, Quebec, Canada, March, 31 - April 2, 2011.
- Frick, A., Newcombe, N. S. (2010). *The long and short of It: Development of spatial scaling abilities*. Poster presented at the Spatial Cognition Conference, Portland, OR, USA, Aug. 15-19, 2010.
- Frick, A., Wang, S. (2010). *Round and round she goes: Effects of hands-on training on mental rotation in 13- to 16-month-olds*. Poster presented at the XVIIth Biennial International Conference on Infant Studies, Baltimore, MD, USA, March 10-14, 2010.
- Frick, A., Newcombe, N. S. (2009). *Measuring mental rotation in 4-year-olds using a nonverbal touch screen paradigm*. Poster presented at the VI biennial meeting of the Cognitive Development Society, San Antonio, TX, USA, Oct.16-17, 2009.
- Frick, A., Wang, S. (2009). *Round and round it goes: Mental rotation in 14- and 16-month-olds*. Talk. Biennial meeting of the Society for Research in Child Development (SRCD), Denver, CO, USA, April 2-4, 2009.

- Frick, A., Rapp, A. F., & Rapinett, G. (2007). *Over rough and smooth: Development of intuitive knowledge about friction*. Poster presented at the biennial meeting of the Society for Research in Child Development, Boston, MA, USA, March 29 - April 1, 2007.
- Frick, A., Daum, M. M., Hug, S. & Wilkening, F. (2006). *Entwicklung intuitiven Wissens über das Hebelgesetz*. Talk. 45. Kongress der Deutschen Gesellschaft für Psychologie (DGPs), Nürnberg, DE, Sept. 17-21, 2006.
- Frick, A., & Daum, M. M. (2005). *Development of dynamic imagery: effects of sensory-motor and visual information*. Poster presented at the IV biennial meeting of the Cognitive Development Society, San Diego, CA, USA, Oct. 21-22, 2005.
- Frick, A., Daum, M. M., Walser, S., & Mast, F. W. (2005). *Developmental changes in the interference of motor processes with mental rotation*. Talk. XXVII Annual Conference of the Cognitive Science Society, Stresa, IT, July 21-23, 2005.
- Frick, A., Daum, M. M., & Wilkening, F. (2004). *Ein Kilo Blei ist schwerer als ein Kilo Federn! Der Einfluss sensumotorischer Information bei der Grössen-Gewichts-Täuschung*. Talk. 46. Tagung experimentell arbeitender Psychologen (TeaP), Giessen, DE, April 5-7, 2004.
- Frick, A., & Daum, M. M. (2003). *How to tilt a glass of water: Dynamic imagery in children and adults*. Poster presented at the 8th Congress of the Swiss Society for Psychology (SGP/SSP), Bern, CH, Oct. 14-15, 2003.
- Frick, A., & Daum, M. M. (2003). *Conservation of water level horizontality in imagined action*. Poster presented at the biennial meeting of the Society for Research in Child Development, Tampa, FL, USA, April 24-27, 2003.
- Frick, A., & Daum, M. M. (2003). *Intuitives Wissen über Horizontalität bei Wasseroberflächen*. Talk. 45. Tagung experimentell arbeitender Psychologen (TeaP), Kiel, DE, March 24-26, 2003.
- Frick, A., & Reips, U.-D. (2002). *The kid's experimental psychology lab: A web site for internet research with children*. Poster presented at the German Online Research Conference (GOR), Hohenheim, DE, Oct.10-11, 2002.
- Frick, A. & Daum, M. M. (2002). *Intuitives Wissen über die Länge sinusförmiger Kurvenlinien*. 43. Kongress der Deutschen Gesellschaft für Psychologie (DGPs), Berlin, DE, Sept. 22-26, 2002.
- Frick, A., Krist, H., Huber, S., & Reips, U.-D. (2001). *Intuitives Wissen über das Pendelgesetz: ein Zeitschätzungsexperiment in Labor und Web*. Talk. German Online Research Conference (GOR). Göttingen, DE, May 17-18, 2001.
- Frick, A., Huber, S., Reips, U.-D., & Krist, H. (2001). *Wahrnehmen, Vorstellen und Urteilen: Wissen über Pendelschwingungen bei Kindern und Erwachsenen*. 43. Tagung experimentell arbeitender Psychologen (TeaP), Regensburg, DE, April 9-11, 2001.
- Frick, A., Bächtiger, M. T., & Reips, U.-D. (1999). *Financial incentives, personal information and drop-out in online studies*. Talk. German Online Research Conference (GOR), Nürnberg, DE, Oct. 27-29, 1999.