

Institution: Birkbeck College
Unit of Assessment: Psychology, Psychiatry, & Neuroscience
Title of case study: Communicating developmental research to millions of parents worldwide: A joint project with industry
1. Summary of the impact (indicative maximum 100 words)

Annette Karmiloff-Smith is a world-leading scientist in the field of cognitive development. This case study describes her ongoing work for Procter & Gamble (P&G) as their scientific consultant for baby development that is based on her research into typical and atypical child development. She designed and wrote booklets, DVDs, and articles for the Pampers.com website on different aspects of child development, sleep, and parent-child interactions. This information has reached millions of parents worldwide. She also checks the scientific correctness of the educational information that P&G communicates on its website, and of statements made by P&G advertising.

2. Underpinning research (indicative maximum 500 words)
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Annette Karmiloff-Smith is known internationally for her seminal contributions to our understanding of normal human cognitive development and atypical development in infants and children with genetic disorders. She contributed to major theoretical and experimental paradigm shifts in many different cognitive domains, different age groups and different neurodevelopmental disorders, using a wide array of methodologies. Her work on genetic disorders in children challenged the accepted view that neurodevelopmental disorders can be explained in terms of patterns of intact and impaired modules, and demonstrated that modules in the adult brain are the result of a gradual process of modularisation over developmental time. Author of 12 books and some 250 book chapters and peer-reviewed articles in high-impact journals, Karmiloff-Smith holds honorary doctorates from Amsterdam, Louvain and Zhejiang. She was the first woman to win the European Science Foundation's Latsis Prize for Cognitive Sciences (2002), and received a CBE in the Queen's Birthday Honours list (2004). In 2010, she received the joint Lifetime Achievement Award from the Research Board of the British Psychological Society.

Karmiloff-Smith's work with P&G is informed by research she has conducted at Birkbeck since 2006. Her research on genetic disorders in children involved healthy infant/toddler control groups. Its findings have been included in the information material for parents produced with P&G on topics such as infant sleep, mother/child interactions, face processing, number, attention, and of early infant underpinnings of later cognitive development. Relevant insights into these topics also come from studies conducted in the context of a European infancy research consortium that was led by Karmiloff-Smith and was funded by P&G (grant G1). Examples of research findings that fed directly into the work with P&G for parents include:

- **Sleep:** Sleep is more than simply a period of rest; parts of the brain are more active during sleep than wakefulness, contributing to the consolidation of learning and memory. Karmiloff-Smith's research on sleep and sleep problems in children (e.g., Hill et al., 2007; Annaz et al., 2011) revealed links between sleep and learning, as well as sleep problems with a high prevalence (bedtime resistance, sleep anxiety, night waking, and daytime sleepiness). These findings demonstrated the importance of identifying and treating sleep problems early in infancy, and directly informed material for parents developed with P&G (see below).
- **Attention and cognitive development:** Karmiloff-Smith's research on cognitive development in perception and attention (e.g., Cornish et al., 2008; Karmiloff-Smith et al., 2010, 2012; Steele et al., 2012) showed that basic perceptual and attentional processes (including selective and sustained attention) affect developmental trajectories across several cognitive domains. As described below, these insights directly fed into booklets, podcasts, DVDs and website articles for parents.

- **Mother/child interaction:** Research funded by P&G (grant G1) led to important insights into how the style of mother/child interaction (controlling versus sensitive/contingent) affected the timing of infant cognitive milestones in the processing of speech, faces, and human action (e.g., Karmiloff-Smith et al., 2010). These insights were included in recent web-based information for parents produced with P&G and articles in *Nursery World* (see section 5).

3. References to the research (indicative maximum of six references)

Peer-reviewed research articles:

Cornish, K., Scerif, G., **Karmiloff-Smith, A.** (2007). Tracing syndrome-specific trajectories of attention across the lifespan, *Cortex*, 43, 672-685.

Hill, C.M., Hogan, A.M., & **Karmiloff-Smith, A.** (2007). To sleep, perchance to enrich learning? *Archives of Disease in Childhood*, 92, 637-343.

Karmiloff-Smith, A., Aschersleben, G., de Schonen, T., Elsabbagh, M., Hohenberger, A. & Serres, J. (2010). Constraints on the timing of infant cognitive change: Domain-specific or domain-general? *European Journal of Developmental Science*, 4, 31-45.

Annaz, D., Hill, C. M., Holly, S., Ashworth, A., & **Karmiloff-Smith, A.** (2011). Characterisation of sleep problems in children with Williams syndrome. *Research in Developmental Disabilities*, 32, 164-169.

Karmiloff-Smith, A. D'Souza, D., Dekker, T. M., Van Herwegen, J., Xu, F., Rodic, M., & Ansari, D. (2012). Genetic and environmental vulnerabilities in children with neurodevelopmental disorders. *PNAS*, 109, 17261-17265.

Steele, A., **Karmiloff-Smith, A.**, Cornish, K.M. & Scerif, G. (2012). The multiple sub-functions of attention: Differential developmental gateways to literacy and numeracy. *Child Development*, 83, 2028-2041.

Research Grants:

Funded by P&G:

(G1) Karmiloff-Smith, A., How mother-child interaction impacts on cognitive milestones in infancy. Procter & Gamble. . 240,000 Euros. 2005-2009.

Other relevant funding:

(G2) Developmental trajectories of unimodal and cross-modal attention deficits. Wellcome Trust Project Grant. 2007-2010.

(G3) Typical and atypical human functional brain development. Joint Co-operative MRC Group Grant. 2003-2009.

(G4) Development of disadvantaged infants. Joint Nuffield Foundation. Since 2011.

(G5) Risk and protective factors of Alzheimer's Disease in Down syndrome infants/adults. Wellcome Trust Strategic Grant. Joint PI. Since 2012.

4. Details of the impact (indicative maximum 750 words)

Karmiloff-Smith's research was brought to the attention of P&G because of her consultancy for the Emmy-winning TV series *Baby It's You* (Channel 4), and her accompanying book which reached No.1 on the London Evening Standard non-fiction list. She is a key contributor to the educational program of Pampers at P&G since 2002. As Pampers' main consultant in the field of baby

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development, she helped design and develop key elements of this educational program, including written materials, podcasts, DVDs, road shows, and exhibitions. As a direct result of Karmiloff-Smith's work with P&G, this company is now an industrial partner in the department's current EC-funded Marie Curie Centre grant.

During the first phase of Karmiloff-Smith's work with P&G until 2009, she wrote six booklets on key issues in child development, covering the period from prenatal to 18 months (title pages of



booklets are shown on the left). These were followed by three booklets for second moms. These booklets were sent to over 450,000 parents per year across the UK, France, Germany, Sweden, Denmark, and Finland. The booklet on infant sleep was particularly successful, and was translated into Italian, Spanish, French, Greek, Hungarian, Russian, Polish, Lithuanian, Latvian, Estonian, Danish, Swedish, Norwegian, Arabic and Hebrew. The popular success of these booklets led to a follow-up DVD-based project with P&G. Karmiloff-Smith designed three DVDs with developmental information tailored to the baby's age (from prenatal to 2 years old), which were sent to over 250,000

parents per year across the same countries.

Since 2010, P&G has distributed development-related materials via their Pampers.com website. Karmiloff-Smith wrote over 50 articles and contributed to 50 monthly newsletters on multiple aspects of baby development, including sleep, perceptual, attentional, cognitive development, and mother-child interactions, on this website (see sources S1-S5 for recent examples). Most were made available globally across many Pampers.com websites (e.g. in Western Europe, South Africa, Philippines etc.). For Western Europe alone, traffic numbers (from Sept. 2011) indicate some 840,000 visitors per month for the website. Individual articles are read on average about 10,000 per year in the UK alone. About 15% of all pregnant mothers across Western Europe are registered to Pampers' monthly electronic newsletters, and this goes up to 26% for mothers with babies 0-36 months old. Thus, over 2 million parents are currently subscribing to these educational newsletters.

Another aspect of Karmiloff-Smith's work with P&G is her ongoing role as scientific advisor on Pampers communications and advertising (as described in an official letter from the Senior Manager for External Relations at P&G; source S6). Throughout the assessment period, Karmiloff-Smith gave talks on child development to P&G staff in their European Headquarters in Geneva, to staff at Pampers Ireland, to the staff at their factory and research facilities in Germany, and she was the keynote speaker at the Pampers Sleep Seminar in London (February 2012). She regularly provides Pampers with up-to-date advice to check the scientific correctness of the claims made in television advertising on sleep, motor development and brain development (e.g., Is it correct that repetitive noise is soothing and helps babies fall asleep? How early do babies start to recognize individual faces?). In 2010, Karmiloff-Smith developed a large-scale Q&A programme for P&G that was sent out by SMS to parents in developing countries. As part of this initiative, she was also involved in the development of hospital posters and other new mothers' materials in South Africa. She also advises advertising agencies and P&G officials on the child attractiveness of packaging options for P&G products. For example, her recommendation to introduce fully opaque and therefore less child-attractive packaging of liquid laundry capsules has been implemented since 2012, and a study conducted in Italy showed a 300% reduction in the accidental ingestion of these capsules by small children.

Karmiloff-Smith's work with P&G demonstrates how collaboration with a multinational

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company can facilitate the effective communication of scientific insights into child development to a wide international audience. According to the Senior External Relations Manager at P&G, “*the millions of parents worldwide who proactively continue to subscribe to our different parenting information are a tribute of the quality and relevance of the content developed by Prof. Karmiloff-Smith*” (source S6).

In addition to informing her work with P&G, Karmiloff-Smith’s developmental research formed the basis for a series of twelve articles on various aspects of child development published in 2010/11 in *Nursery World* (source S7) - a magazine targeting healthcare managers, early years coordinators, child-minders and nursery school teachers with a circulation of 16,000 and a readership of 80,000.

5. Sources to corroborate the impact (indicative maximum of 10 references)

(Copies of all source materials are available upon request if external weblinks are no longer operational.)

S1 – S5: Examples of articles written by Karmiloff-Smith on different aspects of infant and child development, sleep, and parent-child interactions, which are currently available on Pampers.com:

<http://www.pampers.co.uk/child-development-educational-toys-babies-brain>
<http://www.in.pampers.com/children-watching-television-tv-viewing-habits>
<http://www.pampers.co.uk/parenting-emotional-bonds-communication-with-infants>
<http://www.pampers.co.uk/baby-development-parenting-teaching-children>
<http://www.pampers.co.uk/How-to-raise-a-child-with-good-manners>

S6: Senior Manager, External Relations, Procter & Gamble, European Headquarters, Geneva, Switzerland. Contact details are provided separately. A copy of a letter from the Senior Manager describing Karmiloff-Smith’s roles and contributions as P&G’s scientific consultant for infant and child development is available upon request.

S7: Series of 12 articles written by Karmiloff-Smith in 2010 and 2011 for *Nursery World*. Topics were Foetal Development; Piaget and Beyond; Infant & Toddler Social Development; Infant & Toddler Number Development; Infant & Toddler Language Development; Sleep and the Developing Brain. Infant TV and DVDs; Growing Up Multilingual; Gender Differences; Special Talents in Early Development; Handedness in Humans, Apes & Prehistoric Man; Infant Predictors of Reading Abilities.

This series of article in *Nursery World* is announced and described here:

<http://www.nurseryworld.co.uk/nursery-world/other/1105153/professor-annette-karmiloff-smith-developing-brain>
<http://tinyurl.com/ob7hg2n>

Reprints of all articles can be provided upon request.