

Encyclopedia of Cyber Behavior

Zheng Yan
University at Albany, USA

Volume I

Information Science
REFERENCE

Managing Director: Lindsay Johnston
Senior Editorial Director: Heather A. Probst
Book Production Manager: Sean Woznicki
Development Manager: Joel Gamon
Acquisitions Editor: Erika Gallagher
Typesetter: Jennifer Romanchak, Nicole Sparano
Cover Design: Nick Newcomer, Lisandro Gonzalez

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: <http://www.igi-global.com>

Copyright © 2012 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

Encyclopedia of cyber behavior / Zheng Yan, editor.

p. cm.

Includes bibliographical references and index.

Summary: "This book offers a complete look into the field of cyber behavior, surveying case studies, research, frameworks, techniques, technologies, and future developments relating to the way people interact and behave online"-- Provided by publisher.

ISBN 978-1-4666-0315-8 (hardcover) -- ISBN 978-1-4666-0316-5 (ebook) -- ISBN 978-1-4666-0317-2 (print & perpetual access) 1. Internet--Psychological aspects. 2. Computer networks--Psychological aspects. I. Yan, Zheng.

BF637.C45.E53 2010

302.23'1--dc23

2011044984

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

Chapter 5

The Children's Digital Media Center @ Los Angeles

Kaveri Subrahmanyam

California State University, Los Angeles, USA & Children's Digital Media Center @ Los Angeles, USA

Adriana Manago

Children's Digital Media Center @ Los Angeles, USA & University of Michigan, USA

ABSTRACT

The Children's Digital Media Center @ Los Angeles studies young people's interactions with digital media – with a focus on the implications of these interactions for their offline lives and long-term development. Founded by Professor Patricia Greenfield, Distinguished Professor at the University of California, Los Angeles (UCLA), USA, the Center is a collaborative effort of researchers at the UCLA and the California State University, Los Angeles, USA. CDMC@LA researchers have been at the forefront of research on children's and adolescents' use of media ranging from early media forms such as television and video games to more recent ones including various applications on the Internet such as chat rooms, social networking sites, and YouTube. This entry presents an overview of the Center – its history, researchers and collaborators, research focus, and major contributions.

INTRODUCTION

The Children's Digital Media Center @ LA (CDMC@LA) (www.cdmc.ucla.edu) is a collaborative effort between faculty, students, and visiting researchers in the Departments of Psychology at the University of California, Los Angeles (UCLA) and California State University, Los

Angeles (CSULA). The mission of the Center is to study young people's interactions with digital media – with a focus on the implications of these interactions for their offline lives and long-term development. Researchers at the CDMC@LA have been at the forefront of research on young children's use of media ranging from early media forms such as television and video games to more

DOI: 10.4018/978-1-4666-0315-8.ch005

recent ones including various applications on the Internet such as chat rooms, social networking sites, and YouTube. In this entry, we first present an overview of the Center – its history, researchers and collaborators, research focus, and major contributions. Next we describe some of the seminal work done by the Center's founder, Professor Patricia Greenfield, which started the field of interactive media and development and served as a foundation for the Center. Then, we describe early work done at the Center, followed by current work and conclude with future research directions.

OVERVIEW

The CDMC@LA was founded and directed by Dr. Patricia Greenfield, Distinguished Professor of Psychology at UCLA; the Associate Director of the Center is Dr. Kaveri Subrahmanyam, Professor of Psychology at California State University, Los Angeles (CSULA). It began in 2001 as part of the Children's Digital Media Center (CDMC), a consortium funded for five years by the National Science Foundation. The CDMC is perhaps the most lasting legacy of Dr. Rodney R. Cocking, a cognitive developmental psychologist who was "early to understand the value of studying the computer genre that children spent most of their time with - electronic entertainment games, rather than what most researchers were focusing on—the use of computers in formal education" (Greenfield & Calvert, 2004, p. 627). Dr. Cocking established and was the Program Officer for the Developmental and Learning Sciences Program within the National Science Foundation; he launched the Children's Research Initiative (CRI), "an initiative designed to move the field of Developmental Science forward" (Greenfield & Calvert, 2004, p. 629). The CDMC was one of the first centers to be established as part of the CRI and was a collaborative effort involving researchers at several U.S. Universities—Dr. San-

dra Calvert, the Project Director at Georgetown University, Dr. Patricia Greenfield at UCLA, Dr. Barbara O'Keefe at Northwestern University, Dr. Ellen Wartella and Dr. Elizabeth Vandewater at the University of Texas at Austin.

Starting in 2006, the CDMC site at UCLA forged a new identity as the Children's Digital Media Center@LA or the CDMC@LA with sites at UCLA and CSULA. Since the core mission of the Center and the researchers associated with it have remained unchanged throughout, this entry will simply refer to both as the CDMC@LA. In 2011, CDMC@LA researchers at UCLA included Dr. Adriana Manago, as well as doctoral students, Guadalupe Espinoza, Kristen Gillespie-Lynch, Shu-Sha Angie Guan, Yalda T. Uhls, and Lauren Sherman; graduate alumni include Professor Brendesha Tynes, Dr. Lalita Suzuki, and Dr. Elisheva Gross. Undergraduate alumni include Jerel Calzo, a recent Ph.D. from University of Michigan and now a postdoctoral fellow at Harvard, and Goldie Salimkhan, currently CDMC webmaster and collaborator, as well as graduate student in graphic design at Pratt Institute. Researchers at CSULA include graduate students Phuoc Jimmy Tran, Rogelio Carillo, Thomas Staunton, and Minas Mike Michikyan; alumni include Deborah Laurin now a doctoral student at the University of Illinois at Urbana-Champaign, Kevin Linares, and Roy Cheng a graduate student in a joint program at the London School of Economics/University of Southern California, USA. U.S. Collaborators of the CDMC@LA include the following researchers and scholars: Dr. Jaana Juvonen, Professor of Psychology at UCLA, and Dr. Stephanie Reich, Assistant Professor of Education at the University of California, Irvine. Reflecting its international scope, the CDMC@LA also collaborates with researchers in Europe including Dr. David Smahel, Associate Professor at the Institute for Research of Children, Youth and Family, Faculty of Social Studies, Masaryk University (the Czech Republic) and Dr. Natalia Waechter, senior researcher at the Austrian Institute for Youth Research, Vienna.

More details about the Center's researchers are available at the Center website at www.cdmc.ucla.edu.

The basic theoretical premise of the work at the CDMC@LA is that digital media such as computers, games, and the Internet are the new cultural tools of technological societies. Using Vygotsky's sociocultural theory and the idea that tools provided by the culture play a mediating role in cognitive development, Professors Greenfield and Subrahmanyam have argued that these new digital tools will similarly influence the development of thinking and learning (Greenfield, et al., 1994; Maynard, Subrahmanyam, & Greenfield, 2005; Subrahmanyam & Greenfield, 2008b). Drawing on Tikhomirov (1974) and Salomon (1979), they have proposed that with use, different cultural tools elicit and develop different sets of cognitive skills. The initial research compared radio and TV; the findings were that television enhances memory for action stimuli, while radio enhances memory for dialogue and stimulates imagination (Greenfield & Beagles-Roos, 1988). This approach has been used successfully by the Center's researchers to study the effect of television and video game use on the development of cognitive skills and this research is discussed in greater detail in the section titled "Intellectual Foundation for the CDMC@LA."

Extending the idea of computers as a cultural tool to the Internet and various online applications, Greenfield, Subrahmanyam, and Smahel have proposed the co-construction model to conceptualize and understand online interactions (Subrahmanyam, Smahel, & Greenfield, 2006). Specifically, they suggest that given the interactive nature of online contexts, users construct and co-construct their communication environments within applications such as online chat and social networking sites. Research conducted at the CDMC@LA has been among the first to systematically study and understand the culture of young people's online contexts. The Center's researchers have shown that "adolescents construct the same

developmental issues online as they do off, with new affordances such as anonymity, opportunities to discuss sensitive issues, and lack of information about one's physical appearance (such as gender, physical attractiveness, etc.)" (Subrahmanyam et al., 2006, p. 396). This approach has been used successfully by the Center's researchers to conduct innovative work to understand the implications of young people's online interactions for their health, sexuality, identity, and intimate relations. The section titled "Early Work at the CDMC@LA" discusses this body of work in greater detail.

INTELLECTUAL FOUNDATION FOR THE CDMC@LA

The intellectual foundation for the CDMC@LA comes from the seminal work done by the Center's founder, Professor Patricia Greenfield, in the area of interactive media and human development. Her 1984 book, titled *Mind and Media: The effects of television, video games, and computers*, was the first to systematically look at the effects of various media from print to radio to television, as well as computers and video games. At the time of the book's writing, video games and computers were a relatively new technology and viewed primarily as a source of entertainment and possibly even harmful because of their violent content. Prof Greenfield instead argued that every medium has strengths and weaknesses and that it was important to use research findings to understand how we can harness different media to foster children's growth and thinking skills (Greenfield, 1984).

In a subsequent 1990 article titled "Video screens: Are they changing the way children learn," which appeared in the Education Letter published by the Harvard Graduate School of Education, Professor Greenfield pointed out that in addition to the content of video screens that most parents and educators worry about, we also have to be concerned about the effects of the formal features that a particular media form uses. She posed this

important question and one that continues to motivate the research being conducted at the CDMC@LA: "What difference does the video screen make in the way children and adults process information?" (Greenfield, 1990, p. 1) This question has taken on even more significance today as young people's lives are so completely enmeshed in a variety of screens from televisions to computers, and hand held devices.

Professor Greenfield was one of the first to suggest that video screens may actually help children develop visual literacy, which at that time was a new kind of literacy, and argued that such visual literacy skills would be essential to succeed in a world filled with information technology. A solid body of research emanating from her laboratory at the University of California, Los Angeles has shown that video game playing has positive effects in developing the particular attentional, spatial, and iconic representational skills that they utilize (for recent reviews of this research see: Greenfield, 2009b; Subrahmanyam & Greenfield, 2008b; Subrahmanyam & Greenfield, 2011). Although these effects have only been documented in the context of short-term studies, it is very likely that early and continued use of interactive technologies has longer term effects. In this regard, Professor Greenfield has linked the proliferation of informal computer uses such as games to the Flynn effect (Flynn, 1999), which is the documented and dramatic increase in nonverbal or performance IQ scores; she has argued that games and the corresponding development of iconic representational skills may have a causal role in IQ changes which have occurred during the years when modern computer technology was also developing and becoming widespread (Greenfield, 1998). Thus, it is becoming clear that informal uses of computers and video games can have important short- and longer-term consequences for children's skills and development; work on the effects of media continues with projects underway by Dr. Patricia Greenfield in collaboration with current graduate students, Yalda Uhls and Lauren Sherman and past

graduate student, Adriana Manago, currently a postdoctoral fellow at the University of Michigan.

Although this line of work initiated by Professor Greenfield and her students was done in the context of computer and video games, it served as a foundation for the CDMC@LA because it demonstrated the importance of studying the informal uses of technology and their impact on development. Consequently, when the Internet became readily accessible to users outside of research and university settings, and youth began to adopt them in large numbers, researchers at the CDMC@LA were among the first to recognize the importance of studying the implications of this newest cultural tool in young people's lives.

Early Work at the CDMC@LA

As researchers at the CDMC@LA have always been interested in the implications of digital media for children's offline lives and long term development, the particular technologies that the Center has focused on has been driven by the technology and applications that are popular among youth. Early empirical work at the Center examined the implications of young people's use of online chat rooms, bulletin boards, and instant messaging for their health and well being as well as sexuality, identity, and intimacy. Since online chat rooms were a new cultural context, Center researchers Greenfield and Subrahmanyam recognized the importance of first describing and understanding the cultural context of this new venue before they could study their developmental implications. In their 2003 paper published in the *Journal of Applied Developmental Psychology*, Greenfield and Subrahmanyam conducted an in-depth analysis of a transcript of a conversation that occurred in an online teen chat room (Greenfield & Subrahmanyam, 2003). Using techniques of discourse analysis and youth informants, they described how users in teen chat rooms were adapting to the affordances of the medium in order to construct conversational coherence. One of the main insights of this work

was that youth users seemed to be creating a new register for chat – both to compensate for some of the challenges of the medium, such as anonymity, the slower pace of writing compared to oral communication, and disembodiment of the user, and to take advantages of its opportunities, such as anonymity. Additionally, the study demonstrated that chat users are constructing and co-constructing their own environment and highlighted that researchers must first decode a context if they want to study and understand its impact on development.

In subsequent work, researchers at the Center conducted in-depth studies of online chat rooms, bulletin boards, and instant messaging to understand what young people were doing in these new online forums; for a concise account of this early work see Greenfield et al. (2006). These studies collectively revealed that youth integrated fundamental adolescent concerns such as sexuality, identity, and intimacy into the new online forums. For example, both in-depth analysis of a chat transcript and a quantitative analysis of a large corpus of chat utterances (approximately 12,000) revealed that core concerns such as sexuality (Subrahmanyam, Greenfield, & Tynes, 2004), identity (Subrahmanyam et al., 2004; Subrahmanyam et al., 2006), and intimacy (Smahel & Subrahmanyam, 2007) were played out online, sometimes in new and exaggerated ways. For instance, teen chat users took advantage of the anonymous and disembodied chat room to engage in sexual exploration in myriad ways including explicit and implicit sexual utterances and sexualized nicknames; strikingly, there was one sexual utterance every minute, which was very likely much more elevated than in offline contexts (Subrahmanyam et al., 2006). Although the anonymity and freedom of chat rooms seemed to provide youth with opportunities for exploration, CDMC@LA research revealed that these online venues also exposed them to negative interactions. Tynes, Reynolds, and Greenfield

(2004) found that within unmonitored teen chat rooms, users had an approximately 60% chance of being exposed to a negative remark about a racial or ethnic group. This series of chat studies conducted at the CDMC@LA were among the first to systematically investigate these new online contexts and link them to offline aspects of young people's lives.

The trend to project offline concerns and themes to online contexts has been found in other research conducted at the Center that has examined very different online contexts, such as bulletin boards and blogs. Suzuki and Calzo found that, in online health bulletin boards for teens, questions about sexual health, romantic relationships, pregnancy/birth control, and sexual preferences/techniques were most frequent (Suzuki & Calzo, 2004). In a less anonymous context such as weblogs or blogs, peers were also quite salient; Subrahmanyam and colleagues found that blog entries written by adolescents were mostly about peers and everyday life (Subrahmanyam, Garcia, Harsono, Li, & Lipana, 2009). The teen authors used the blogs as a means to create narratives about themselves, as well as the people and events in their lives. By studying publicly available online interactions, this early body of work provided a unique window into young people's lives that was previously not possible.

Instant messaging, another popular early application, was the focus of some other early work conducted at the Center by Gross (Gross, 2004, 2009; Gross, Juvonen, & Gable, 2002). Using a daily diary methodology, Gross and colleagues showed that the pre-teen participants in their study devoted the greatest amount of their online time to instant messaging, and in particular to communicating with peers from their offline lives (Gross et al., 2002). This was one of the first research studies to show that, in addition to core developmental concerns, youth also bring the people in their offline lives to their online contexts. Additionally, the study found that youth who reported feeling

lonely or socially anxious on a given day were more likely to use instant messaging that day to interact with people whom they did not know well.

In a follow up experimental study, Gross used a cyberball task (the computer equivalent of playing catch) to simulate social inclusion or exclusion among adolescent participants; subsequently study participants interacted with an unknown opposite-sex peer via instant messaging or played a computer game (Gross, 2009). Participants who were excluded in the cyberball task reported greater negative affect (for example, shame, and anger, and lower self-esteem) than those who were included. Furthermore, excluded participants who interacted online with an unknown peer experienced greater recovery from negative affect than excluded participants who played a solitary computer game.

In addition to these empirical studies, Center researchers have also written and published several theoretical and review articles on the role of computers and other digital media on children's development. Important theoretical contributions include papers on the following topics: gender differences in computer game play (Subrahmanyam & Greenfield, 1998), analysis of the Flynn effect, including the role of technology (Greenfield, 1998), role of media symbol systems in the development of cognitive skills (Maynard et al., 2005; Subrahmanyam & Greenfield, 2008b), and online communication in development (Subrahmanyam, 2007; Subrahmanyam, 2009). Review articles have surveyed research on the implications of computers and the Internet for human development (Subrahmanyam, Greenfield, Kraut, & Gross, 2001; Subrahmanyam, Kraut, Greenfield, & Gross, 2001; Subrahmanyam, Kraut, Greenfield, & Gross, 2000) and the role of online communication in adolescents' relationships and development (Subrahmanyam & Greenfield, 2008a). Greenfield has also advanced the field by editing or co-editing a number of special issues on media and development in the *Journal of Applied Developmental Psychology* (Greenfield

& Calvert, 2004; Greenfield & Cocking, 1994; Subrahmanyam & Greenfield, 2008c). Along with Professor Zheng Yan, editor of this encyclopedia, Greenfield co-edited the first special issue focused on interactive media and human development published in *Developmental Psychology* (Yan & Greenfield, 2006). Together, these contributions have helped to advance our understanding of the role of new digital media in development.

Current Work at the CDMC@LA

As the online applications used most frequently by youth began to change, researchers at the Center had to develop new methodologies and paradigms to study these new contexts. The most significant change in online applications was the shift from anonymous and public interactions (e.g., chat rooms) to more private and less anonymous applications (e.g., instant messaging, text messaging, and social networking sites such as Facebook). Concerns about safety had also led to changes in online applications and users were able to restrict who saw their online communications. These changes were most apparent in the next generation of applications such as social networking sites (SNSs) and virtual worlds. In this section, we describe more recent research on these applications conducted by researchers at the CDMC@LA

One of the first studies on SNSs to come out of CDMC was in keeping with the notion that researchers must first describe the cultural context of social media in which youth are engaged in order to decipher the developmental implications of these new technologies. Utilizing a focus group methodology, Manago, Graham, Greenfield and Salimkhan (Manago, Graham, Greenfield, & Salimkhan, 2008) explored college students' subjective experiences using MySpace. The objective was to describe how processes of identity development, a central task during emerging adulthood, adapt to the unique affordances of social networking sites. The research built upon earlier CDMC@

LA conceptualizations of technology as cultural tools that elicit particular cognitive competencies, but this time, applied the theoretical framework to the development of social skills. Qualitative analyses of focus group interviews focused on personal, social, and gendered self-presentations. The study found that youth were using social network sites to cultivate multifaceted aspects of the self - sometimes idealized, experimental or possible selves - by broadcasting pictures, personal interests and social exchanges to their audience of contacts on their networks, on average 185 "friends". A key insight from this study was that the introduction of a collection of large numbers of friends as an audience for self-performances afforded new channels for experimenting with and reifying incipient aspects of the self.

A subsequent study by Salimkhan, Manago and Greenfield asked a small number of college students to guide researchers on a videotaped tour of their MySpace profile (Salimkhan, Manago, & Greenfield, 2010). Recording participants' visual behaviors on the social network site, in concert with participants' explanations of these online behaviors, represented a methodological "next step" to understanding youths' experiences on social network sites. Qualitative analyses of these profile tours revealed the growing importance of iconic visual representations to identity development in this generation of emerging adults. Visual and textual data demonstrated how youth using social networking sites employ visual metaphors to represent and solidify connections with others, how they create visual narratives of their lives through photos to connect past and present selves, and how they use multimedia to integrate pop cultural imagery and meanings into their sense of self. The study also proposed that these kinds of visual processes of self-presentation on social networking sites potentially obscure the line between self-promotion and advertisement of self as a brand in emerging adults' identity development.

Whereas these studies focused on small numbers of participants, qualitative data, and identity

development processes, Subrahmanyam in collaboration with Reich, Waechter, and Espinoza documented quantitatively the relationships social networking sites were engendering among adolescents and emerging adults (Reich, Subrahmanyam, & Espinoza, in press; Subrahmanyam, Reich, Waechter, & Espinoza, 2008). Adopting a two-step data collection procedure that entailed an offline and online survey, these studies showed that there was overlap between adolescents' and emerging adults' offline and online (social networking sites and instant messaging) networks providing further evidence that young people's online and offline lives are psychologically connected.

Building on research from the CDMC@LA pointing to the ways social networking sites generate an emphasis on self-promotion among youth in the "digital native" generation, Yalda Uhls, in collaboration with Patricia Greenfield, set out to determine whether a trend toward self-focused individualistic values might be happening on a cultural level as evidenced in popular media targeted at youth. Their research examined the most prominent values in the top two most popular television shows among young adolescents, ages 9 -11, across four decades, 1967 to 2007 (Uhls & Greenfield, 2011). They surveyed adult participants using personality indices to measure their perceptions of the value priorities in the television programming. As they predicted, the individualistic value of "fame" was perceived to be the top value priority in the most popular television programming in 2007, rising from a ranking of 15 out of 16 possible in previous decades. In contrast, the value "community feeling" was ranked 11th in 2007, declining from its top first or second spot in the previous decades. In making sense of these findings, the authors of this study drew from Greenfield's Theory of Social Change and Human Development (Greenfield, 2009a), which suggests that socio-demographic changes such as increasing technology shift cultural values toward increasing individualism, which then structures children's socialization

environments and psychological development. Uhls and Greenfield (2011) concluded that the jump in communication technologies from 1997 to 2007 might be one of the engines driving the historical reversal in cultural value priorities seen in the data, especially prominent between the last two decades.

What are the mechanisms by which increasing technology might shift cultural values and psychological development in the direction of an increasing orientation toward the self? To pursue this line of research, Uhls and Greenfield (Uhls & Greenfield, in press) expanded upon their content analysis by examining how preteens interpret a heightened focus on fame in popular media. The researchers conducted focus groups and surveys with preteens, ages 10-12. In order to assess uptake by children of fame and other individualistic values portrayed in preteen television. They found that fame was the most frequent value selected by participants as a motivation for their future goals. Qualitative analyses demonstrated the ways in which they made meaning out of fame in media programming by prioritizing the importance of public recognition in their own lives. Further, the majority of these pre-teen participants used YouTube to seek an expanded audience outside of their physical communities.

During this time, other researchers at the UCLA site of the CDMC@LA also began to question the other side of the coin of a cultural shift toward increasing individualism with the advent of new communication technologies in the 21st century: potential decrements in the development of social psychological skills for intimacy. Developmental psychologists consider the transition to adulthood an important period for the maturation of intimacy in relationships. Perhaps Facebook represents another mechanism by which technology shifts cultural values and development during this sensitive period of life toward increasing individualism. With college students using Facebook to amass hundreds of "friends" in their social networks, might they be learning through this tool to em-

phasize large webs of instrumental relations rather than small, more intimate social relations?

To break ground on this question, Manago, Taylor and Greenfield (Manago, Taylor, & Greenfield, in press) devised an online survey to examine the anatomy of college students' Facebook networks and their Facebook activities by randomly sampling a portion of their network. They uncovered a variety of associations that confirmed many of the theoretical assertions suggested by Greenfield's (2009a) Theory of Social Change and Human Development with regards to technological innovations; however, the study also added new qualifications and nuances to the theory. Participants' self-reports of relationships on Facebook indicated that superficial relationships (acquaintances and activity contacts) comprised 51% of college students' Facebook networks, whereas only 21% were close relationships (family, significant others, close friends) and that networks grew by adding disproportionately more superficial contacts over close contacts. Those with larger networks estimated that larger numbers of contacts in their networks were observing their status updates, a form of public communication to one's entire contact list. The major function of status updates was emotional disclosure, the key feature of intimacy. This finding indicates the transformation of the nature of intimacy in the environment of a social network site: Self-disclosure has moved from the private to the public realm. In addition, larger networks and larger estimated audiences predicted higher levels of life satisfaction and perceived social support on Facebook. These findings emphasize the psychological importance of audience in the Facebook environment. This emphasis on one's audience harmonizes with Uhls and Greenfield's findings concerning the importance of fame and supports the prediction from Greenfield's theory that technology pushes development in an individualistic direction. Findings also suggest that social networking sites help youth to satisfy enduring human psychosocial

needs for permanent relations in a geographically mobile world—youth with higher proportions of maintained contacts from the past (primarily high school friends) perceived Facebook as a more useful tool for procuring social support.

Other applications and aspects of new media use have also been the focus of studies at the Center. At the CSULA site of the CDMC@LA, researchers recently published a paper on the virtual world, Second Life (SL) (Linares, Subrahmanyam, Cheng, & Guan, 2011). The paper examined SL residents' avatars, activities, and the relationship between residents' offline characteristics such as identity and online avatars and activities. Identity in this study was operationalized in terms of identity processing style, which is a preference in the social cognitive strategies used to engage in or avoid tasks related to creating or maintaining a sense of identity (Berzonsky, 1992). Using an online survey of SL residents, who reported that their age ranged from 18 to 69 years, the study found that SL residents mostly adopted human avatars that were of the same gender as their offline selves. Interestingly, residents reported that their frequent SL activities were shopping and interacting with others; these are also activities common in everyday offline life. Most importantly, residents' identity processing styles offline were related to their beliefs and activities within SL, particularly those related to online self-presentation and relationship development. This study showed that contrary to speculation, SL residents did not create entirely new and different second lives within this particular virtual world, but were instead bringing elements of their first or offline lives into this online context. In another study of an entirely different online context, Laurin and Subrahmanyam conducted a content analysis of online support groups for postpartum depression (Laurin & Subrahmanyam, n.d.). The researchers found that messages that conveyed informational and emotional support dominated the discussion just as with face-to-face support groups. These studies provide further evidence that adult users'

online and offline lives may also be psychologically connected.

In addition to cutting edge research on new applications and processes in digital worlds, CDMC@LA researchers have also continued to make important contributions to the literature by way of theoretical (Subrahmanyam & Greenfield, 2011) review articles (Guan & Subrahmanyam, 2009), and a special issue devoted to social networking sites (Subrahmanyam & Greenfield, 2008c); a recent book surveyed the field of new digital media and adolescent development (Subrahmanyam & Smahel, 2010).

FUTURE RESEARCH DIRECTIONS

Research at the CDMC@LA is ongoing in the areas of both cognitive and social development and emphasizes a multi-method approach incorporating qualitative, quantitative, survey, observation, biological, fMRI, and experimental research designs. For instance, at the UCLA site, graduate students Sherman and Uhls are using experimental designs to examine the emotional and cognitive effects of technology use. Similarly at the CSULA site, graduate students Tran and Carillo are using experimental paradigms to investigate the cognitive impact of the multitasking that occurs in the context of digital media use. A common theme underlying all of the past, present and future projects at the CDMC is an investigation of the ways technological innovations channel socialization and development in particular directions by emphasizing particular skills, competencies, and social psychological rewards.

ACKNOWLEDGMENT

Both authors wish to thank Prof Patricia Greenfield for her mentorship and leadership at the CDMC@La as well as for her comments and feedback on an earlier draft of this entry.

REFERENCES

- Berzonsky, M. D. (1992). Identity style and coping strategies. *Journal of Personality, 60*, 771–788. doi:10.1111/j.1467-6494.1992.tb00273.x
- Flynn, J. R. (1999). Searching for justice: The discovery of IQ gains over time. *The American Psychologist, 54*, 5–20. doi:10.1037/0003-066X.54.1.5
- Greenfield, P. M. (1984). *Mind and media: The effects of television, video games, and computers*. Cambridge, MA: Harvard University Press.
- Greenfield, P. M. (1990). Video screens: Are they changing the way children learn? *Harvard Educational Letter, 1-4*.
- Greenfield, P. M. (1998). The cultural evolution of IQ. In Neisser, U. (Ed.), *The rising curve. Long-term gains in IQ and related measures* (pp. 81–123). Washington, DC: American Psychological Association. doi:10.1037/10270-003
- Greenfield, P. M. (2009a). Shifting pathways of child development: Linking sociocultural change and developmental change. *Developmental Psychology, 45*, 401–408. doi:10.1037/a0014726
- Greenfield, P. M. (2009b). Technology and informal education: What is taught, what is learned. *Science, 323*, 69–71. doi:10.1126/science.1167190
- Greenfield, P. M. (1994). Cognitive socialization by computer games in two cultures: Inductive discovery or mastery of an iconic code? *Journal of Applied Developmental Psychology, 15*, 59–85. doi:10.1016/0193-3973(94)90006-X
- Greenfield, P. M. (2006). Teens on the Internet: Interpersonal connection, identity, and information. In Brynin, M., & Kiesler, S. (Eds.), *Computers, phones, and the Internet: Domesticating information technology* (pp. 185–200). New York, NY: Oxford University Press.
- Greenfield, P. M., & Beagles-Roos, J. (1988). Radio vs. television: Their cognitive impact on different socio-economic groups. *The Journal of Communication, 38*, 71–92. doi:10.1111/j.1460-2466.1988.tb02048.x
- Greenfield, P. M., & Calvert, S. L. (Eds.). (2004). Electronic media and human development: The legacy of Rodney R. Cocking. *Journal of Applied Developmental Psychology, 25*(6). doi:10.1016/j.appdev.2004.09.001
- Greenfield, P. M., & Cocking, R. R. (Eds.). (1994). Effects of interactive entertainment technologies on development. *Journal of Applied Developmental Psychology, 15*(1). doi:10.1016/0193-3973(94)90002-7
- Greenfield, P. M., & Cocking, R. R. (Eds.). (1994). Effects of interactive entertainment technologies on development. *Journal of Applied Developmental Psychology, 15*(1). doi:10.1016/0193-3973(94)90002-7
- Greenfield, P. M., & Subrahmanyam, K. (2003). Online discourse in a teen chatroom: New codes and new modes of coherence in a visual medium. *Journal of Applied Developmental Psychology, 24*, 713–738. doi:10.1016/j.appdev.2003.09.005
- Gross, E. F. (2004). Adolescent Internet use: What we expect, what teens report. *Journal of Applied Developmental Psychology, 25*, 633–649. doi:10.1016/j.appdev.2004.09.005
- Gross, E. F. (2009). Logging on, bouncing back: An experimental investigation of online communication following social exclusion. *Developmental Psychology, 45*, 1787–1793. doi:10.1037/a0016541
- Gross, E. F., Juvonen, J., & Gable, S. L. (2002). Internet use and well-being in adolescence. *The Journal of Social Issues, 58*, 75–90. doi:10.1111/1540-4560.00249

- Guan, S. S. A., & Subrahmanyam, K. (2009). Youth Internet use: risks and opportunities. *Current Opinion in Psychiatry*, *22*, 351–356. doi:10.1097/YCO.0b013e32832bd7e0
- Laurin, D., & Subrahmanyam, K. (n.d.). *An exploration of social support provision among postpartum depression Internet support groups*. Manuscript in preparation.
- Linares, K., Subrahmanyam, K., Cheng, R., & Guan, S.-S.A. (2011). A second life within *Second Life*: Are virtual world users creating new selves and new lives? *International Journal of Cyber Behavior, Psychology and Learning*, *1*, 50–71. doi:10.4018/ijcbpl.2011070104
- Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology*, *29*, 446–458. doi:10.1016/j.appdev.2008.07.001
- Manago, A. M., Taylor, T. N., & Greenfield, P. M. (in press). Me and my 400 friends: The anatomy of college students' Facebook networks and its relationship to communication patterns and well-being. *Developmental Psychology*.
- Maynard, A. E., Subrahmanyam, K., & Greenfield, P. M. (2005). Technology and the development of intelligence: From the loom to the computer. In Sternberg, R. J., & Preiss, D. D. (Eds.), *Intelligence and technology: The impact of tools on the nature and development of human abilities* (pp. 29–53). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Reich, S. M., Subrahmanyam, K., & Espinoza, G. (in press). Friending, iMing and hanging out face-to-face: Overlap in adolescents' online and offline social networks. *Developmental Psychology*.
- Salimkhan, G., Manago, A. M., & Greenfield, P. M. (2010). The construction of the virtual self on MySpace. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *4*. Retrieved September 16, 2011, from <http://www.cyberpsychology.eu/view.php?cisloclanku=2010050203>.
- Salomon, G. (1979). *Interaction of media, cognition, and learning*. San Francisco, CA: Jossey-Bass.
- Smahel, D., & Subrahmanyam, K. (2007). “Any girls want to chat press 911”: Partner selection in monitored and unmonitored teen chat rooms. *Cyberpsychology & Behavior*, *10*, 346–353. doi:10.1089/cpb.2006.9945
- Subrahmanyam, K. (2007). Adolescent online communication: Old issues, new intensities. *Cyberpsychology & Behavior*, *1*. Retrieved from <http://www.cyberpsychology.eu/view.php?cisloclanku=2007070701>
- Subrahmanyam, K. (2009). Developmental implications of children's virtual worlds. *Washington and Lee Law Review*, *66*, 1065–1084.
- Subrahmanyam, K., Garcia, E. C., Harsono, S. L., Li, J., & Lipana, L. (2009). In their words: Connecting online weblogs to developmental processes. *The British Journal of Developmental Psychology*, *27*, 219–245. doi:10.1348/026151008X345979
- Subrahmanyam, K., & Greenfield, P. M. (1998). Computer games for girls: What makes them play? In Cassell, J., & Jenkins, H. (Eds.), *From Barbie to Mortal Kombat: Gender and computer games* (pp. 46–71). Cambridge, MA: The MIT Press.
- Subrahmanyam, K., & Greenfield, P. M. (2008a). Communicating online: Adolescent relationships and the media. *The Future of Children*, *18*, 119–146. doi:10.1353/foc.0.0006

- Subrahmanyam, K., & Greenfield, P. M. (2008b). Media symbol systems and cognitive processes. In Calvert, S., & Wilson, B. (Eds.), *The Blackwell handbook of children, media, and development* (pp. 166–187). England, UK: Blackwell Publishing. doi:10.1002/9781444302752.ch8
- Subrahmanyam, K., & Greenfield, P. M. (Eds.). (2008c). Implications of social networking sites. *Journal of Applied Developmental Psychology*, 29(6). doi:10.1016/j.appdev.2008.07.004
- Subrahmanyam, K., & Greenfield, P. M. (2011). Digital media and youth: Games, Internet, and development. In Singer, D., & Singer, J. (Eds.), *Handbook of children and the media* (2nd ed., pp. 75–96). Thousand Oaks, CA: Sage.
- Subrahmanyam, K., Greenfield, P. M., Kraut, R. E., & Gross, E. F. (2001). The impact of computer use on children's and adolescents' development. *Journal of Applied Developmental Psychology*, 22, 7–30. doi:10.1016/S0193-3973(00)00063-0
- Subrahmanyam, K., Greenfield, P. M., & Tynes, B. M. (2004). Constructing sexuality and identity in an online teen chat room. *Journal of Applied Developmental Psychology: An International Lifespan Journal*, 25, 651–666. doi:10.1016/j.appdev.2004.09.007
- Subrahmanyam, K., Kraut, R., Greenfield, P., & Gross, E. (2001). New forms of electronic media: The impact of interactive games and the Internet on cognition, socialization, and behavior. In Singer, D., & Singer, J. (Eds.), *Handbook of children and the media* (pp. 73–99). Thousand Oaks, CA: Sage.
- Subrahmanyam, K., Kraut, R. E., Greenfield, P. M., & Gross, E. F. (2000). The impact of home computer use on children's activities and development. *The Future of Children*, 10, 123–144. doi:10.2307/1602692
- Subrahmanyam, K., Reich, S. M., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults. *Journal of Applied Developmental Psychology*, 29, 420–433. doi:10.1016/j.appdev.2008.07.003
- Subrahmanyam, K., & Smahel, D. (2010). *Digital youth: The role of media in development*. New York, NY: Springer.
- Subrahmanyam, K., Smahel, D., & Greenfield, P. M. (2006). Connecting developmental constructions to the Internet: Identity presentation and sexual exploration in online teen chat rooms. *Developmental Psychology*, 42, 395–406. doi:10.1037/0012-1649.42.3.395
- Suzuki, L. K., & Calzo, J. P. (2004). The search for peer advice in cyberspace: An examination of online teen bulletin boards about health and sexuality. *Journal of Applied Developmental Psychology*, 25, 685–698. doi:10.1016/j.appdev.2004.09.002
- Tikhomirov, O. K. (1974). Man and computer: The impact of psychological processes on the development of psychological processes. In Olson, D. E. (Ed.), *Media and symbols: The forms of expression, communication, and education* (pp. 357–382). Chicago, IL: University of Chicago Press.
- Tynes, B. M., Reynolds, L., & Greenfield, P. M. (2004). Adolescence, race, and ethnicity on the Internet: A comparison of discourse in monitored vs. unmonitored chat rooms. *Journal of Applied Developmental Psychology*, 25, 667–684. doi:10.1016/j.appdev.2004.09.003

Uhls, Y. T., & Greenfield, P. M. (2011). The rise of fame: An historical content analysis. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 5(1). Retrieved September 16, 2011, from <http://cyberpsychology.eu/view.php?cisloclanku=2011061601&article=1>

Uhls, Y. T., & Greenfield, P. M. (in press). The value of fame: Preadolescent perceptions of popular media and their relationship to future aspirations. *Developmental Psychology*.

Yan, Z., & Greenfield, P. M. (Eds.). (2006). Children, adolescents, and the Internet. *Developmental Psychology*, 42(3). doi:10.1037/0012-1649.42.3.418

ADDITIONAL READING

Greenfield, P. M. (1994). Video games as cultural artifacts. *Journal of Applied Developmental Psychology*, 15, 3–12. doi:10.1016/0193-3973(94)90003-5

Greenfield, P. M. (2004). Developmental considerations for determining appropriate Internet use guidelines for children and adolescents. *Journal of Applied Developmental Psychology*, 25, 751–762. doi:10.1016/j.appdev.2004.09.008

Greenfield, P. M., DeWinstanley, P., Kilpatrick, H., & Kaye, D. (1994). Action video games and informal education: Effects on strategies for dividing visual attention. *Journal of Applied Developmental Psychology*, 15, 105–123. doi:10.1016/0193-3973(94)90008-6

Greenfield, P. M., & Yan, Z. (2006). Children, adolescents, and the Internet: A new field of enquiry in developmental psychology. *Developmental Psychology*, 42, 391–394. doi:10.1037/0012-1649.42.3.391

Rideout, V. J., & Foehr, U. G., & Roberts, D. F. (2010). *Generation M²: Media in the lives of 8- to 18-year-olds*. Retrieved from <http://www.kff.org/entmedia/upload/8010.pdf>

Subrahmanyam, K. (2010). Technology and physical and social health. In Peterson, P., Baker, E., & McGaw, B. (Eds.), *International encyclopedia of education (Vol. 8, pp. 112–118)*. Oxford, UK: Elsevier. doi:10.1016/B978-0-08-044894-7.00713-2

Subrahmanyam, K., & Greenfield, P. M. (2008). Virtual worlds in development: Implications of social networking sites. *Journal of Applied Developmental Psychology*, 29, 417–419. doi:10.1016/j.appdev.2008.07.004

Subrahmanyam, K., & Lin, G. (2007). Adolescents on the Net: Internet use and well-being. *Adolescence*, 42, 659–677.

Suzuki, L. K., & Beale, I. L. (2006). Personal web home pages of adolescents with cancer: Self-presentation, information dissemination, and interpersonal connection. *Journal of Pediatric Oncology Nursing*, 23, 152–161. doi:10.1177/1043454206287301

Valkenburg, P. M. (2004). *Children's responses to the screen: A media psychological approach*. Lawrence Erlbaum Associates.