



# Online programs as tools to improve parenting: A meta-analytic review<sup>☆</sup>



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## ABSTRACT

**Background:** A number of parenting programs, aimed at improving parenting competencies, have recently been adapted or designed with the use of online technologies. Although web-based services have been claimed to hold promise for parent support, a meta-analytic review of online parenting interventions is lacking.

**Method:** A systematic review was undertaken of studies ( $n = 19$ ), published between 2000 and 2010, that describe parenting programs of which the primary components were delivered online. Seven programs were adaptations of traditional, mostly evidence-based, parenting interventions, using the unique opportunities of internet technology. Twelve studies (with in total 54 outcomes,  $N_{tot}$  parents = 1615 and  $N_{tot}$  children = 740) were included in a meta-analysis.

**Results:** The meta-analysis showed a statistically significant medium effect across parents outcomes ( $ES = 0.67$ ;  $se = 0.25$ ) and child outcomes ( $ES = 0.42$ ;  $se = 0.15$ ).

**Conclusions:** The results of this review show that web-based parenting programs with new technologies offer opportunities for sharing social support, consulting professionals and training parental competencies. The meta-analytic results show that guided and self-guided online interventions can make a significant positive contribution for parents and children. The relation with other meta-analyses in the domains of parent education and web-based interventions is discussed.

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## 1. Introduction

Several authors have suggested that the Internet has great potential for delivering parenting interventions in an accessible way (Daneback & Plantin, 2008; Funderburk, Ware, Altshuler, & Chaffin, 2009; Scharer, 2005). The use of the Internet has increased rapidly since it became widely available in 1995. Parenting professionals, involving multiple disciplines, such as pediatrics, counseling and nursing, have begun to exploit the opportunities afforded by online technology and the Internet now offers a rapidly increasing number of resources for parents. The potential of online resources for parents is widely acknowledged (e.g., Long, 2004; Rothbaum, Martland, & Beswick Janssen, 2008). A recent review shows that the first studies on this subject were published in 1998 and the evaluated internet services since then reflected an emphasis on parents of preschool children, mostly concerning health topics (Nieuwboer, Fukkink, & Hermanns, 2013).

The Internet offers unique opportunities to design empowerment-oriented resources for learning, modeling and support (Amichai-Hamburger, 2008). Whereas traditional parenting intervention programs are often targeted at specific minorities with certain risk factors (e.g., Shonkoff & Meisels, 2000), the Internet is the information and

support resource of choice for large groups of parents. Visitor numbers to parenting websites run as high as hundreds of thousands per month (Brent, 2009; O'Connor & Madge, 2004; Sarkadi & Bremberg, 2005). The wish to upscale parenting programs and the phenomenon of mass media parenting interventions are not new (Laurendeau, Gagnon, Desjardins, Perreault, & Kishchuk, 1991; Sanders & Montgomery, 2000; Schoenwald & Hoagwood, 2001; Self-Brown & Whitaker, 2008; Turner & Sanders, 2006). However, in comparison to traditional media like hardcopy newsletters and television broadcasts, the Internet enables new, highly interactive opportunities for communication between parents and professionals (Amichai-Hamburger, 2008; D'Alessandro & Dosa, 2001). Typically, information pages, e-mail consultations and digital training modules represent types of online communication, in which professionals may disseminate current knowledge and offer tailored advice, whereas peer support is provided through group forums and discussion boards.

Web-based parenting programs may embrace a public health approach with the aim to support everyday parenting and inform and assist with frequently occurring parenting questions, stimulating a responsive and positive attitude towards children (e.g., Eshel, Daelmans, de Mello, & Martines, 2006; Sanders, Bor, & Morawska, 2007; Sanders & Kirby, 2012). However, parents may also seek professional help in difficult circumstances, like social isolation, divorce, illness, or child disabilities (Anastopoulos, Guevremont, Shelton, & DuPaul, 1992; Gurdin, Huber, & Cochran, 2005; Schwartz et al., 2003). Furthermore, parenting can be a challenging task in certain stages of child development,

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e.g., transition to parenthood, infancy, adolescence (Belsky & Rovine, 1984; Glascoe & Dworkin, 1995).

The current fast-speed, broad-band Internet offers new interactive, multi-media experiences, which are currently used in different resources to increase parental competencies focusing on knowledge, attitudinal or behavioral aspects of parenting. Available programs include instructional and modeling animations and video to disseminate knowledge (see Ritterband, Thorndike, Cox, Kovatchev, & Gonder-Frederick, 2009). One of the attractive features of the Internet is the opportunity to receive and give social support anonymously. Discussion boards and group forums are web-based technologies which enable such interactions between peers, contributing to emotional well-being, confidence, and self-efficacy (e.g., Bellafiore, Colón, & Rosenberg, 2004; Braithwaite, Waldron, & Finn, 1999; McKenna, 2008). Finally, web-based training can be used as a technology that can structure step-by-step learning, tailored to individual progress (LaMendola & Krysik, 2008). Internet interventions can be designed to be self-guided or they may be guided, for instance by a start-off face-to-face session or email coaching. However, one of the motivations for internet interventions is to help a large number of individuals with a low amount of professional involvement (Ritterband et al., 2009). To summarize, the Internet offers different possibilities for parents with different needs. Large numbers of parents use the Internet to find information, support and concrete advice, supplementing and enhancing traditional forms of parenting services.

Meta-analytic reviews have reported positive effects of traditional (i.e., not web-based) parental support at parent and child level (see, for example, Fukkink, 2008; Kaminski, Valle, Filene, & Boyle, 2008; Lundahl, Risser, & Lovejoy, 2006; MacLeod & Nelson, 2000). Less is known about the effects of online programs for parents and a systematic review is currently lacking. In fact, several authors have described online parenting support as a service “in its infancy” and little is known of the effects of technology-driven services for parents and their families (D'Alessandro, D'Alessandro, & Colbert, 2000; Madge & O'Connor, 2006; Mallen, Vogel, Rochlen, & Day, 2005; Ritterband & Palermo, 2009; Self-Brown & Whitaker, 2008). Experimental evaluations of online resources for parents are relatively scarce (Plantin & Daneback, 2009; Weiss et al., 2004; Zubrick et al., 2005). However, interesting studies have recently been published which evaluated the effects of online resources on parenting competencies, including knowledge, attitudinal and behavioral aspects. In this line of study, also some traditional evidence-based programs (e.g., the Play and Learning Strategies Program, PALS, and the Positive Parenting Program, Triple P), were adapted for online dissemination, and have been evaluated. Also transfer effects of web-based parental support on the development of children have recently been investigated. In this review study, we aim to synthesize the experimental outcomes in the relatively new domain of web-based parenting resources for parental competencies and children's development.

## 2. Method

### 2.1. Selection of studies

To find empirical studies on web-based parenting services we conducted a search in the databases of the Social Science Citation Index, PsycINFO, and PubMed. The extensive search strategy included blocks of various key words related to parenthood (parent\*, mother\*, father\*, child\*, famil\* or pediater\*), parental support (counsel\*, coach\*, support\*, empower\*, advice or train\*), and the specific online context (internet\*, online, mail, chat, computer\*, website\*).

There were three inclusion criteria for this review. First, the primary components of the studied resource were delivered online; second, the primary target group of these resources exists of parents who had children aged between –9 months (pregnancy) and 21 years (adulthood). Finally, studied resources were aimed at improving parenting competencies. One original research report, which was pre-published online

in 2009, was included. Editorials, commentaries, reviews, and conference papers were excluded.

After screening for duplicates and screening the studies with our eligibility criteria, 19 research articles published between 1998 and 2010 comprised the final set of studies. Seven studies described the development or application of online programs. Twelve out of 19 studies were experimental and were included in the meta-analysis.

### 2.2. Coding

We developed a coding scheme to describe resource and user characteristics of the web-based resources and to assess the methodological characteristics of their evaluations. Two independent coders (i.e., the first and the second author) coded each study.

With respect to resource features we coded types of online communication (i.e., information pages, e-mail consultation, group forum); facilitation of professional or peer support. Further, parent and child demographics and risk factors were coded on the basis of early intervention theory (see Shonkoff & Meisels, 2000), i.e., on the parent level: pregnancy, first time parenthood, single parenthood, low income; on the child level: physical handicaps, mental health problems, illness. Finally, we coded the following methodological aspects of the research design: type of research (experimental, descriptive); research period; sample size; allocation and randomization; use of incentives; types of tests and experimental results.

Inter-coder reliability was evaluated by determining Cohen's kappa ( $\kappa$ ) in the case of nominal variables and by the intra-class correlation (*ICC*, two-way random, absolute agreement) for continuous variables, using .70 as the cut-off score for inclusion. Reliability proved satisfactory to excellent for the majority of the coded variables, with  $\kappa$  ranging from .77 to 1, and *ICC* ranging from .81 to 1. In the case of divergent codes, final codes were established by discussion.

### 2.3. Analysis

Twelve of the studies in this review were included in the meta-analysis. Of these, two studies had a one-group pretest–posttest design, while ten studies were randomized controlled trials. Most of the studies identified in the search included multiple outcomes reflecting several aspects of parenting. This procedure yielded a database containing 35 effect sizes at the parent level, reported in 11 studies ( $N_{tot} = 1615$ ). At the child level, the database was smaller, with 19 effect sizes, reported in 4 studies ( $N_{tot} = 740$ ).

Effect sizes were derived directly from reported means and standard deviations. Hedges' *g*, which corrects for bias resulting from small samples, was used as the effect size estimate (Hedges & Olkin, 1985). For inherently negative variables, effect sizes were recoded by changing the sign. The large scale approximation formula of Becker (1988; see also Morris, 2000) has been used to estimate the variance for effect sizes from within-designs. Correlation values for the pretest and posttest were not reported and conservative estimates of .5 were therefore used to estimate the variance of the effect sizes of these designs.

Effect sizes were subsequently integrated into an overall effect size according to a random effects model, using a multilevel approach. This model acknowledges the hierarchical nature of the data, with effect sizes (i.e., the lowest level) nested under treatments (i.e., the highest level). The multi-level approach also allows the explanation of heterogeneous outcomes through moderator analysis (e.g., analyzing an association between effect size and type of design or type of outcome measure). The specification and testing of models were conducted with MLwiN, using restricted maximum-likelihood estimation (Bryk & Raudenbusch, 2002; Hox, 2002).

Using a medium effect size of 0.50 from the meta-analysis as a cut-off score, studies with positive outcomes are discussed in a brief narrative review. Following the descriptive framework of Proudfoot et al.

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