

# Web-based Cognitive Behavioural Therapy for Postnatal Depression



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## AIMS

In Australia approximately 40,000 women annually suffer postnatal depression (PND) by the time their baby is 3 months old. Symptoms of depression can be treated effectively through Internet interventions but, to date, no research has examined an intervention specifically for the treatment of PND, despite the special needs of women who are depressed while caring for a new infant. Due to time constraints and stigma, most women with PND do not access help. However Web-based interventions are both accessible and anonymous.

We aimed to develop a prototype of the first Web-based intervention for PND - *MumMoodBooster*.

## BACKGROUND

Left untreated, PND has significant deleterious effects on the mother, her partner and her child's cognitive and psychosocial development (Beck, 1998; Cornish et al., 2005; Kaplan et al., 2011). Children of mothers with PND are themselves at elevated risk of mental health difficulties in adolescence (Pawby et al., 2008). Under the federally funded National Perinatal Depression Initiative, every perinatal woman in Australia will soon be screened for symptoms of PND, resulting in a sharp increase in numbers of women identified and requiring effective, accessible treatment.

*MumMoodBooster* was developed with funding from the US National Institute of Health, based upon our *Getting Ahead of Postnatal Depression* CBT program (Milgrom et al., 1999; 2005) which itself draws upon the *Coping with Depression* (CWD) course (Lewinsohn et al., 1969; Lewinsohn et al., 1984). Important refinements specific to postnatal women include: a) introducing behavioural activation (increasing pleasant activities) before presentation of cognitive strategies; b) relaxation "on the run" techniques; c) reducing "homework" to reduce time demands on new mothers; d) building support networks; e) partner sessions; and f) infant issues.

## MumMoodBooster

Figure 1 displays the structure of the Web-based intervention. Interactive activities are central to the design to engage women. Initial steps of the program provide explicit direction whereas latter steps encourage women assume greater responsibility for managing their own plan for change. In recognition of the important role of partners and paternal depression in the treatment process for PND (Paulson et al., 2010), we developed a module on *You and Your Partner* as well as a free-standing Partner Support Website designed specifically for partners, with a separate user login.

**Sequential access.** Tunnel information architecture (Danaher et al., 2005) provides step-by-step guidance through **six sessions** structured to optimise engagement and resulting behaviour change (lower portion Figure 1). Each session begins by reviewing previous material prior to presenting new content. The program's charting function helps participants see the functional relation of mood and activity levels. Information from past sessions is used to reinforce gains made, to tailor subsequent program content, and to provide ipsative feedback (DiClemente et al., 2001). Users set their own pace, of particular importance as women with PND are often overwhelmed by infant care. A printable summary describes key content covered and a tailored list of recommended home practice activities. The major areas covered in each session are listed in Figure 1.

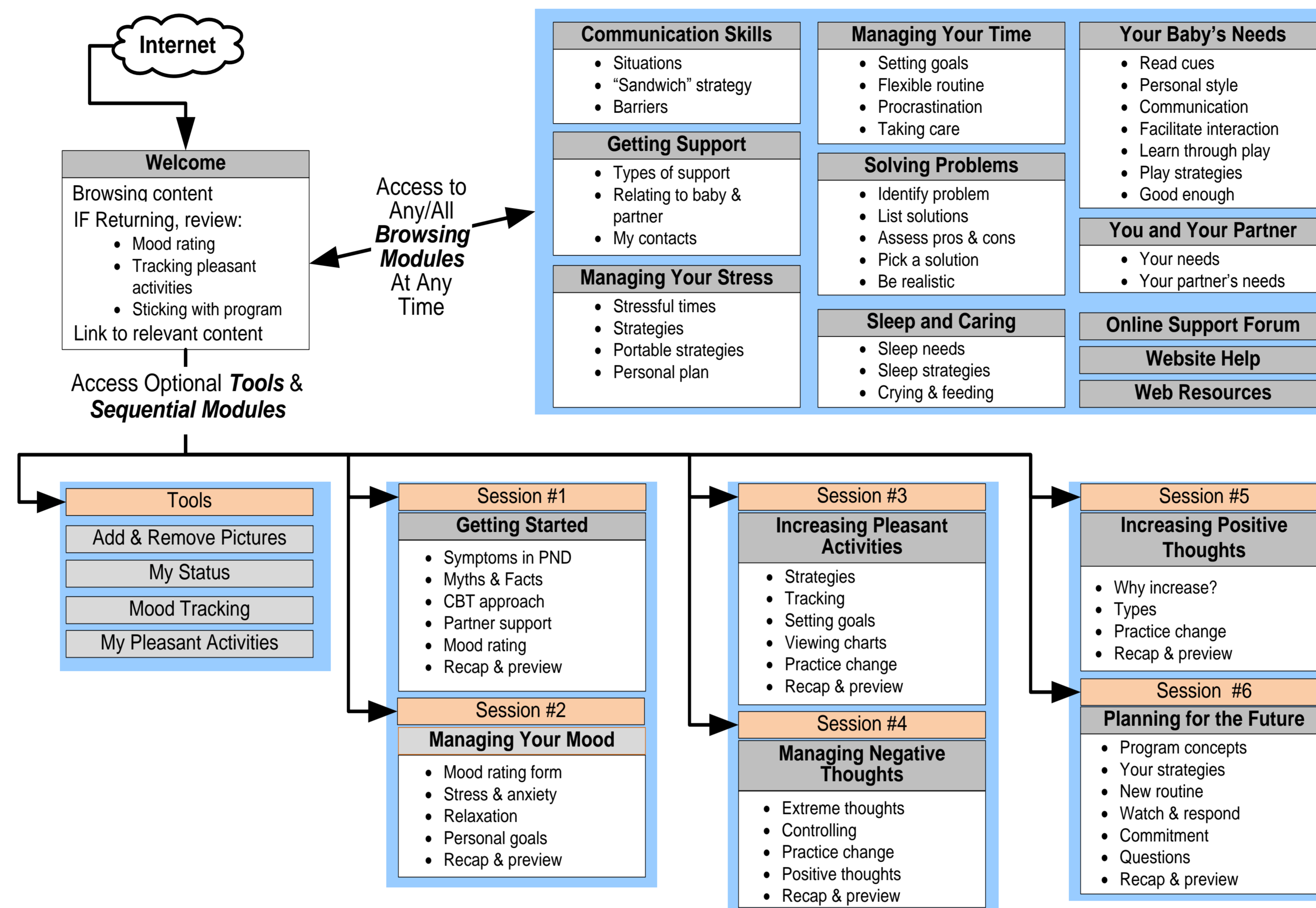
**Unrestricted access.** The intervention offers unrestricted access to browse modules on different topics ranging from relaxation, problem solving, to getting support for parenting. Users also have unrestricted access to a **Web forum** for peer support. The program functions on popular browsers for both Windows PCs and Macintosh computers.

**Video & audio content.** Use of video content can enhance participant's self-efficacy to accomplish recommended strategies.

**Literacy.** Text, audios, and videos were assessed using the Flesch-Kinkaid Readability Test, appropriate to a grade 6 reading level.

**Animation.** We used JavaScript and Flash plug-in to enhance interactivity and to provide vector graphic animation as a tool to increase engagement and learning.

Figure 1: Structure of the *MumMoodBooster* Web-based Intervention



## PROGRAM DEVELOPMENT

Over the course of three years, we developed the *MumMoodBooster* Web-based CBT intervention through a systematic, iterative process following the Science Panel on Interactive Communications and Health guidelines (Henderson et al., 1999) consistent with a staged approach for the development and testing of behavioural interventions (Danaher et al., 2008, 2009; Rounsaville et al., 2001). Focus groups and usability testing with postpartum women guided the adaptation of program content, structure, and design. We tailor materials to individual participant characteristics to enhance program credibility (Fogg, 2003), efficacy and user satisfaction (Bandura, 2004; Teo et al., 2005). We include access to a Web forum provides peer support. As video content has important benefits in terms of engaging participants we created video coping models, hosted by experts.

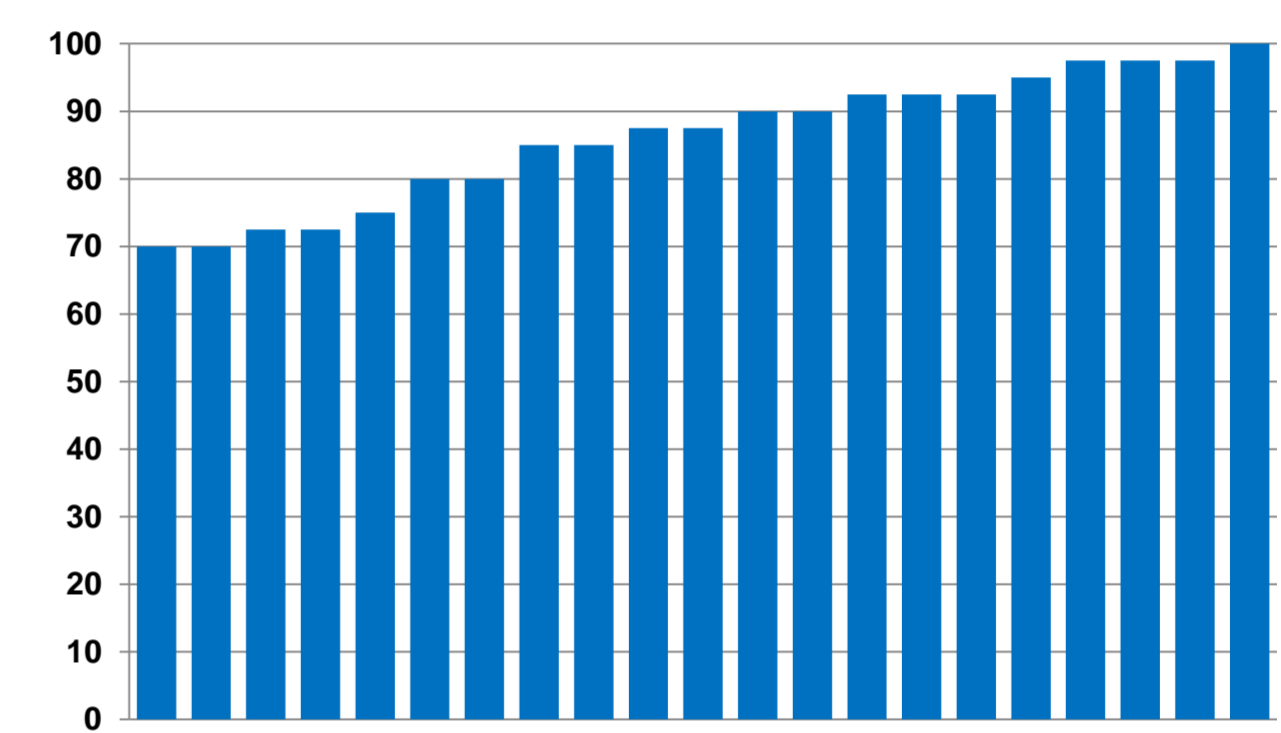
**Focus Groups** We conducted focus groups in Australia and in Iowa (US). These provided relevant guidance as to what features were most important for the target population whilst retaining the core program content. Groups lasted about an hour and transcripts were coded to enable content analysis of salient constructs, issues, and language use. Inclusion criteria were: English-speaking, <12 months postpartum; ≥ 18 years of age; home Internet access and email user; and depressive symptoms since the birth of their baby. The Melbourne group included 8 women (mean age 36.0 years, SD = 5.5 years). The Iowa group was composed of 9 women (mean age 29.4 years, SD = 6.19 years). Participants were shown the basic features of the program using screen shots of sample webpages and were then asked to share their opinions about the features described and to give their reactions to the program's colours, fonts, and imagery. Discussion was facilitated by researchers and observed by additional research team members.

**Usability Testing** Following the focus group sessions, 22 usability testers (who satisfied inclusion/exclusion criteria) tested user-system interactions (Nielsen, 2001). Twenty testers are needed to identify 95% of usability problems (Faulkner, 2003). Women were asked to "think-aloud" as they viewed screens, videos, and engaged in interactive activities. Sessions were audio-taped, and coding categories developed to characterise responses. Testers completed Brooke's (1996) System Usability Scale (SUS). Sessions were held in both Australia (n=14) and in Iowa (n=8).

## RESULTS

Focus group participant comments were overwhelmingly positive: e.g., "really hopeful, like you can do something about it," and "I think this is wonderful, because you can do it at home." SUS scores can range from 0 [negative] to 100 [positive]. Example SUS items include "I think that I would like to use this website frequently" and "I felt very confident using the website." SUS results (Figure 2) indicated *MumMoodBooster* to have excellent usability: Mean= 86.2 (SD=2.13).

Figure 2 System Usability Scale Results for Usability Testers (N=21)



## SIGNIFICANCE

- PND is prevalent, causes enormous suffering to women, their partners and has an adverse impact on infant development.
- There are substantial barriers to clinic-based treatments and uptake is disappointingly low.
- CBT is effective in treating PND, and CBT can be successfully delivered via the Internet.
- No Web-based treatments currently exist for postnatal depression.
- The use of information technology in the treatment of mental health difficulties has great potential to reduce health system treatment costs. The first economic analysis of computerised CBT accessed in primary care clinics has shown this model to be highly cost-effective (McCrone et al., 2004) as have more recent economic evaluations (e.g. Warner et al., 2010).

## NEXT PHASE OF THE PROJECT

A feasibility treatment trial of *MumMoodBooster* for postnatal women diagnosed with a depressive episode (N = 50) is scheduled to be completed this year (see Table 1 below).

## Summary of Feasibility Trial Design

Table 1: Measures by Assessment Point for RCT

	Method	Screening	Baseline Exclusion	Baseline info	Safety Monitoring Wk. 2 Wk. 4	Post-Test 6 wks.	Follow-Up 3 mos.	Follow-Up 6 mos.
Contact information	paper/phone	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
Informed consent	mail	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
Edinburgh Postnatal Depression Scale (EPDS)	Ref #1	<input checked="" type="checkbox"/>						
Internet Use & Experience	Ref #2	<input checked="" type="checkbox"/>						
Sociodemographic Information	paper/phone		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Structured Clinical Interview (SCID)	Ref #3		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
Hamilton Rating Scale for Depression (HAM-D)	Ref #4		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Beck Depression Inventory (BDI-II)	Ref #5		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Depression, Anxiety & Stress Scales (DASS-21)	Ref #6		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Personal Health Questionnaire (PHQ-9)	Ref #7		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Maternal Skills, Stress, & Self-Efficacy	Ref #8-9	online		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Behavioral Activation Scale for Depression (BADSD)	Ref #10	online		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Automatic Thoughts Questionnaire (ATQ)	Ref #11	online		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Behavioral Self-Efficacy	online			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dyadic Adjustment Scale (DAS-7)	Ref #12	online		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
System Usability Scale (SUS)	Ref #13	online		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Use of Other Programs	phone					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Program Acceptability	phone					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Program Usage & Engagement	unobtrusive						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Measures cited in Table 1:  
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