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Tailoring Printed Materials for Improving Child Find

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This practice-based research synthesis examined the characteristics of tailored printed materials associated with changes in reader attitudes, knowledge, and behavior. A secondary analysis of 13 randomized controlled trial studies including more than 10,000 participants was the focus of review. The secondary synthesis included the analysis of seven characteristics of the printed materials and the estimated sizes of effects associated with these characteristics. Results showed that the majority of key characteristics of tailored printed materials were related to differences in the study outcomes but that two characteristics (advice/guidance and personal efficacy) had value-added benefits. Findings are described in terms of the implications for developing printed materials for improving child find and increasing referrals to early intervention and preschool special education.

Purpose

The purpose of this practice-based research synthesis was to identify the characteristics of tailored print materials associated with changes or improvements in reader attitude, knowledge, and behavior. This was accomplished by conducting a secondary analysis of a review of studies done by Skinner et al. (1999) with a focus on those characteristics of printed materials that could inform the development of brochures, pamphlets, and other print materials for improving child find and promoting referrals to early intervention and preschool special education. The Skinner et al. (1999) review included 13 studies that were used to compare and contrast the effectiveness of different approaches to tailoring printed materials all designed to affect changes in study participants' outcomes.

The secondary analysis was guided by a framework that focuses on the characteristics of practices that are associated with desired outcomes (Dunst, Trivette, & Cutspec, 2002). Information in the Skinner et al. (1999) review on the characteristics of the printed materials included in the original studies was coded and analyzed to discern the relative importance of the features in terms of the study participant benefits. This was accomplished in this practice-based research synthesis to identify what matters most in terms of explaining study outcomes.

Background

Printed materials are used widely in a number of fields to inform people about available services and to change behavior (see e.g., Clark, AbuSabha, von Eye, & Achterberg, 1999; Currie, Rajendran, Spink, Carter, & Anderson, 2001; Franke-Ogg & Pritchard, 1989; Freemantle et al., 2003). Some type of brochure, pamphlet, information sheet, or other kind of printed material is typically used by early intervention programs and preschool special education programs to describe different aspects of who is served, the services provided, how to make a referral, who to contact, etc. (Dunst, Lucas, & Click, 2004).

Printed materials include many different characteristics that have been the focus of review and analysis (e.g., Allensworth & Luther, 1986; Ley & Morris, 1977; Paul &

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Redman, 1997). One feature of printed materials that has been the focus of attention is the extent to which *tailoring* the materials matters in terms of intended outcomes (Azar, 1999; Eakin, Glasgow, & Riley, 2000; Kreuter, Farrell, Olevitch, & Brennan, 2000). Tailoring refers to the preparation of materials that specifically attempt to reach and affect changes in a targeted audience. According to Ryan and Lauver (2002), “tailored interventions could be improved by (a) *identifying the most salient characteristics to be tailored*, (b) further delineating essential components of [tailored interventions], (c) determining the efficacy of different delivery channels..., and (e) clarifying whether the efficacy of [tailored interventions] changes over time” (p. 331, emphasis added).

Description of the Practice

Kreuter, Strecker, and Glassman (1999) define tailoring as “any combination of strategies and information *intended to reach one specific person*, based on characteristics that are unique to that person, related to the outcome of interest, and *derived from an individual assessment*” (p. 277). Tailored material and communication have highly individualized content and are based on information about the intended audience. For example, a brochure used to improve child find would be considered tailored if it both addressed a specific audience (e.g., physicians) and included information that the audience deemed important (e.g., what benefits would accrue to patients referred to early intervention). According to Kreuter et al. (1999), tailored printed materials are more likely to be effective when one is trying to reach a specific subpopulation with specific conditions, concerns, or needs (e.g., parents of young children with disabilities). The extent to which tailoring printed materials is supported by research findings was the focus of this practice-based research synthesis.

Search Strategy

Search Terms

The search terms used by Skinner et al. (1999) to identify relevant studies were not included in their review. The key terms used by the investigators were *tailored*, *tailoring*, *print material*, and *communication*. These terms presumably were used to identify the studies included in their review.

Sources

MEDLINE and PsychLit were the two sources used to identify relevant studies. The search was limited to the years 1986 to 1998.

Selection Criteria

Studies were included if they “all were randomized

controlled trials assessing individually tailored interventions with a comparison intervention” (Skinner et al., 1999, p. 291). The definition and description of tailoring described by Kreuter et al. (1999) guided study selection.

Search Results

Thirteen (13) studies in 12 research reports were included in the Skinner et al. (1999) review. Table 1 includes information on the study participants and Table 2 includes the codes of the printed materials assigned for this practice-based research synthesis.

Participants

The 13 studies included 10,204 participants. Gender was reported in all but one study. About three quarters (77%) of the participants were female and one quarter were male. Ethnicity was reported or could be discerned in seven studies (54%). Eighty one (81) percent to 100% of the study participants in any one study were white or from European countries that are primarily Caucasian.

Information about participant ages and education were reported for five (38%) and eight (62%) studies respectively. The mean ages of the participants ranged from 21 to 44 years with all but one study including adults between 39 and 44 years of age on average. The education levels of the participants ranged from those having less than a high school education to those with college degrees.

Printed Materials

Table 2 shows the type of tailored materials used in the studies and the codes of the materials according to seven print features. Computerized letters or newsletters were used in five studies (38%), written reports or feedback were used in three studies (23%), a brochure or newsletter were used in three studies (23%), and written letters were used in two studies (15%). The types of printed materials were one of two types: those used on an *a priori* basis to affect study participant change (9 studies) and those that provided feedback on a *post hoc* basis (4 studies).

Seven features of the tailored materials were coded for this practice-based research synthesis to discern which features mattered most in terms of study outcomes: Personal information, efficacy beliefs, readiness for change, advice and guidance, perceived risks, barriers to change, and benefits of change.¹ *Personal information* included the recipient’s name, personal medi-

¹A number of studies included financial incentives as a supplemental condition that were considered not relevant for the purposes of this secondary analysis and therefore were not included in this synthesis.

cal history, the physician's name, name of the medical practice, appointment times, etc. *Efficacy beliefs* included information about self-efficacy expectations, efficacy enhancement, causal attributions, etc. *Readiness for change* included attitude toward and intention to change, participant stage of change, stage based feedback, etc. *Advice and guidance* included recommendations, self-help booklets, program feedback, tips for affecting change, etc. *Perceived risk* included perceived risk status, perceived susceptibility, perceived threats, the risks for not changing behavior, etc. *Barriers to change* included information on factors that needed to be overcome to affect change. *Benefits of change* included information on the reasons or factors contributing to positive behavior change. The number of characteristics coded in all 13 studies ranged from 5 to 9 (Table 2). The number of characteristics coded in any one study varied from one (Brinberg & Axelson, 1990) to seven (Campbell et al., 1994).

Synthesis Findings

Table 3 shows the coding of the 13 studies in terms of the purpose of this research synthesis. The table includes the particular comparisons that constituted the focus of analysis, the outcomes for each comparison, and the estimated sizes of effects of the tailored printed-materials interventions. The source material for the data used to calculate the estimated effect sizes was from Table 1 in the Skinner et al. (1999) review and information provided in the text of the Skinner et al. paper. In those instances where discrepancies were found between the table and text, the original study reports were examined to clarify the results.

Types of Comparisons

The main focus of analysis in all of the studies was between tailored materials vs. nontailored materials. There were two types of tailored-materials comparisons: tailored materials alone vs. a comparison or no material control group, and tailored materials plus a second condition vs. a comparison or no material control group. The second conditions included nutritional counseling (NC), booster letter (BL), self-help booklet (SB), telephone consultation (PC), health risk appraisals (HRA), and manuals that matched (MM) the state of change of the intervention group participants. The contrasting conditions allowed tests of the value-added benefits of combining tailored materials with another intervention. Eight studies included tests of effects of tailored materials alone and seven studies included tests of the effects of tailored materials plus another intervention.

Outcomes

The outcomes for which estimates of effect sizes

could be determined included message readership, recall, or credibility; attitude toward and intention to change; and behavior change.² The latter included measures of dietary changes (e.g., decreased fat intake or increased fruit intake), smoking cessation, physical exercise, and completion of health-related tasks. Message readership, recall, or credibility were measured in seven studies (54%), attitude toward or intention to change was measured in six studies (46%), and behavioral outcomes were measured in 12 studies (92%).

Sizes of Effects

The estimated sizes of effect were assessed in two ways: (1) Cohen's *d* effect sizes for the differences between the comparisons described above and (2) the differences in the percent change between the intervention and comparison groups in the studies. Cohen's *d* effect sizes were calculated from the *p* values included in the Skinner et al. (1999) paper for between group differences using procedures described by Rosenthal (1994).³ These are the lower limit effect size estimates for between group differences (Denis, 2003; Iacobucci, 2005). The percent difference estimates were determined by examining the study participants' responses to dichotomously scored questions and ascertaining the percent of the samples that provided positive responses and subtracting the comparison group percent from the experimental group percent to obtain the estimated size of effect.

The last two columns of Table 3 include the estimated sizes of effects that were able to be calculated for the 42 between group comparisons constituting the focus of analysis. Cohen's *d* effect sizes could be calculated for three quarters (74%) of the comparisons, and the percent difference favoring the printed-materials groups could be calculated for just over half (57%) of the comparisons.

The average Cohen's *d* effect size for all studies and comparisons combined was .25 (95% confidence interval [CI] = .19 to .30) and the average percent difference for all studies and comparisons combined was 19 (95% CI = 15 to 23). These findings, taken together, indicate that the use of tailored materials for affecting changes in study participants' knowledge, attitude, and behavior was effective. Preliminary analyses, however, found that the use of tailored materials for affecting changes in smok-

²The outcomes that were measured once and in only one study (e.g., nutrition knowledge) were not included in the analyses described next.

³In the largest number of cases, conventional (e.g., $p < .05$) rather than exact *p* values were reported that necessarily produced conservative estimates of effect sizes. This was not considered a problem for purposes of this synthesis because our main focus was the average sizes of effects for the different practice characteristics.

ing cessation was not as effective as for other purposes. Because this particular kind of intervention did not have direct implications for informing improvements in child find, the results from these studies were excluded from further consideration.

Table 4 summarizes the findings for the Cohen's *d* effect-size estimates according to the study focus, type of printed material, seven printed-material features, number of tailored features, type of comparison, and type of outcome. These findings were the basis for primary interpretation of the results and were supplemented by the percent difference findings (Table 5) for the same study characteristics variables.

A number of patterns of results emerged from the analyses highlighting the characteristics of and conditions under which tailored materials had positive effects. First, gained framed messages (tailored materials) and positive focused interventions (study focus) tended to yield the largest effect sizes (*ds* and %), whereas interventions focusing on risk reduction and tailored messages communicating risks or losses (tailored materials) tended to be associated with smaller effect sizes (*ds*).

Second, tailored materials that included feedback on study participant behavior or actions had some value-added benefits in terms of the sizes of effects (*ds* and %) associated with the intervention. The feedback presumably functioned as a reinforcement for participants efforts to change.

Third, several material features appeared to have some value-added benefits in terms of the sizes of effects associated with intervention impact. Tailored materials that included advice and guidance and that placed emphasis on personal responsibility for change (efficacy beliefs) tended to yield somewhat larger effect sizes (*ds*). All of the printed-material features, however, were associated with positive study outcomes (*ds* and %). The number of tailored-material features that were included in brochures, newsletters, or letters did not appear to matter as much as the messages themselves as evidenced by mixed effect size findings (*ds* vs. %).

Fourth, the sizes of effects (*ds* and %) for combining tailored materials with a second kind of intervention indicated that doing so had value-added benefits in terms of optimal positive study outcomes. This finding is consistent with results from other studies showing that printed materials used in combination with other interventions tend to produce better outcomes (Faulkner et al., 2003; Grimshaw et al., 2006).

Fifth, the effects of tailored materials were much alike regardless of outcome (*ds* and %). The fact that actual behavior change was associated with use of tailored materials is especially encouraging since the use of tailored materials for child find purposes would be specifically intended to either promote referrals by primary

referral sources or have parents or other primary caregivers specifically seek out early intervention or preschool special education.

Sixth, pattern analysis by inspection (Table 3) suggested that the use of tailored materials together with a second intervention that involved behavioral action or advice tended to be associated with the largest sizes of effects. This finding suggests that behavioral interventions that used tailored materials to spark changes were to some degree more effective.

Conclusion

Findings from this secondary analysis of printed tailored-materials interventions confirmed the conclusions made by Skinner et al. (1999) in their original review of the 13 studies included in this paper. Results showed that tailoring printed materials is associated with positive study outcomes. This secondary analysis helps identify the specific features of printed materials and the conditions under which interventions are most effective. Gain-framed messages and materials that include advice and guidance and that are used in conjunction with another intervention are more likely to be associated with the largest sizes of effect.

Findings from this synthesis should be considered suggestive rather than definitive given the small number of studies and the ways in which the sizes of effects needed to be estimated (see Footnote 3). Notwithstanding these concerns, the results nonetheless do have implications for preparing printed materials for improving child find and increasing referrals to early intervention and preschool special education.

Implications for Practice

The *Endpoints* (Vol. 2, Number 4) nontechnical summary of this research synthesis includes a checklist for developing and using tailored printed materials for conducting child find. The checklist was developed based on the findings reported in this *Cornerstones* research synthesis as well as from results of other syntheses (Clow, Dunst, Trivette, & Hamby, 2005; Dunst & Gorman, 2006). The checklist includes guidelines for developing tailored messages (message framing), preparing tailored printed materials (material preparation), and using the tailored materials together with other child find practices (interventions) to promote and sustain referrals to early intervention and preschool special education.

Tailoring printed materials for reaching different targeted audiences for improving child find means having not one but several different program brochures, pamphlets, program descriptions, etc. According to Azar (1999) "personalized...messages may be twice as effective as one-size-fits-all" (p. 1) materials. Having differ-

ent printed materials for different audiences may seem inefficient, but in today's world of desktop publishing, developing tailored printed materials is not only feasible but easily accomplished (see especially Kreuter et al., 2000). The payoff in doing so is likely to be more effective child find.

Research reported in other syntheses (Clow et al., 2005; Faulkner et al., 2003; Grimshaw et al., 2005) indicates that passive distribution of printed materials (tailored or not) are not likely to be effective or as effective as other kinds of interventions that include face-to-face interactions with the people targeted for behavior change. It is therefore likely to be the case that tailored materials will be most effective when used in conjunction with other kinds of child find practices.

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Table 1
Background Characteristics of the Study Participants and the Study Focus

Study	Sample Size	Gender (%)		Study Focus
		Male	Female	
Brinberg & Axelson (1990)	113	44	56	Healthy dietary behavior
Brug et al. (1996)	347	83	17	Healthy dietary behavior
Brug et al. (1998)	646	18	82	Healthy dietary behavior
Campbell et al. (1994)	459	25	75	Healthy dietary behavior
Curry et al. (1990)	1,217	48	52	Smoking cessation
Curry et al. (1995)	1,137	NR	NR	Smoking cessation
Kreuter & Strecher (1995, 1996)	1,317	35	65	Health risks
Marcus et al. (1998)	150	24	76	Physical exercise
Meldrum et al. (1994)	3,083	0	100	Cancer screening
Prochaska et al. (1993)	756	38	62	Smoking cessation
Skinner et al. (1994)	497	0	100	Cancer risks
Strecher et al. (1994, Study 1)	72	32	68	Smoking cessation
Strecher et al. (1994, Study 2)	410	33	67	Smoking cessation

Table 2
Characteristics of the Printed Material Used in the Studies

Study	Type of Tailored Material	Tailored Materials Features						
		Personal Information	Efficacy Beliefs	Readiness for Change	Advice/ Guidance	Perceived Risks	Barriers to Change	Benefits to Change
Brinberg & Axelson (1990)	Brochure				X			
Brug et al. (1996)	Computer Letter	X	X		X		X	X
Brug et al. (1998)	Computer Letter		X	X	X			
Campbell et al. (1994)	Computer Letter	X	X	X	X	X	X	X
Curry et al. (1990)	Feedback	X	X		X			
Curry et al. (1995)	Report	X	X	X	X			
Kreuter & Strecher (1995, 1996)	Newsletter	X		X		X	X	X
Marcus et al. (1998)	Report		X	X	X			
Meldrum et al. (1994)	Letter	X			X			
Prochaska et al. (1993)	Computer Report		X	X	X			
Skinner et al. (1994)	Computer Newsletter			X		X	X	X
Strecher et al. (1994, Study 1)	Newsletter		X	X		X	X	X
Strecher et al. (1994, Study 2)	Letter	X		X		X	X	X
Number of Studies		7	8	9	9	5	6	6

Table 3
Study Outcome Measures and Estimated Effects of the Interventions

Study	Comparison ^a	Outcomes	Estimated Effect Sizes	
			Cohen's <i>d</i>	Percent Difference
Brinberg & Axelson (1990)	TM(NC) vs. NTM(NC)	Message recall	.56	27
	TM(NC) vs. NTM(NC)	Fiber intake (↑)	NR ^b	13
	TM(NC) vs. C	Fiber intake (↑)	.43	18
Brug et al. (1996)	TM vs. NTM	Message readership	.28	30
	TM vs. NTM	Intention to change	.28	– ^c
	TM vs. NTM	Fat intake (↓)	.22	–
	TM vs. NTM	Fruit/vegetable intake (↑)	NR	–
Brug et al. (1998)	TM + TM(BL) vs. NTM	Message readership/recall	.20	6
	TM + TM(BL) vs. NTM	Message credibility	.20	–
	TM+ TM(BL) vs. NTM	Intention to change	.20	–
	TM + TM(BL) vs. NTM	Fat intake (↓)	.20	–
	TM + TM(BL) vs. NTM	Fruit/vegetable intake (↑)	.20	–
Campbell et al. (1994)	TM vs. NTM	Message readership/recall	.39	40
	TM vs. NTM	Fat intake (↓)	.18	14
	TM vs. C	Fat intake (↓)	.22	20
	TM vs. NTM + C	Fruit/vegetable intake (↑)	NR	–
Curry et al. (1991)	TR + SB vs. SB	Smoking cessation (24h)	.10	–
	TR + SB vs. SB	Smoking cessation (7d)	.12	5
Curry et al. (1995)	TR + PC vs. SB	Message recall	-.14	–
	TR + PC vs. SB	Workbook completion	.14	–
	TR + PC vs. SB	Smoking cessation	.14	5
Kreuter & Strecher (1995, 1996)	TM vs. HRA	Message recall	NR	–
	TM + HRA vs. C	Attitude (optimism)	–	27
	TM + HRA vs. C	Attitude (pessimism)	–	36
	TM vs. HRA + C	Health behavior	.10	18
	TM vs. HRA + C	Cholesterol screening	.10	25
	TM vs. HRA + C	Fat intake (↓)	.10	–
Marcus et al. (1998)	TR + MM vs. NTM	Intention to change	.37	–
	TR + MM vs. NTM	Physical activity (3m)	.32	–
	TR + MM vs. NTM	Physical activity (6m)	.43	26
	TR + MM vs. NTM	Exercise maintenance (3m)	.32	–
	TR + MM vs. NTM	Exercise maintenance (6m)	.56	23
Meldrum et al. (1994)	TM vs. NTM	Repeat screening	NR	–
Prochaska et al. (1993)	TR + MM vs. NTM	Smoking cessation	.18	11
Skinner et al. (1994)	TM vs. NTM	Message readership	.22	13
	TM vs. NTM	Message recall	.18	–
	TM vs. NTM	Intention to change (S1) ^d	–	11
	TM vs. NTM	Intention to change (S2)	–	19

Table 3, continued

Study	Comparison ^a	Outcomes	Estimated Effect Sizes	
			Cohen's <i>d</i>	Percent Difference
Strecher et al. (1994) Study 1 (Sample 1)	TM vs. NTM	Smoking cessation	.56	24
Strecher et al. (1994) Study 1 (Sample 2)	TM vs. NTM	Smoking cessation	NR	0
Strecher et al. (1994) Study 2 (Sample 1)	TM vs. C	Smoking cessation	.28	12
Strecher et al. (1994) Study 2 (Sample 2)	TM vs. C	Smoking cessation	NR	0

^aTM = Tailored materials, TR = Tailored report, NTM = Nontailored materials, TM(NC) = Tailored materials plus nutrition counseling, TM(BL) = Tailored materials plus booster letters, SB = Self-help booklet, PC = Telephone consultation, HRA = Health risk appraisal, MM = Stage-matched manual, and C = Control group.

^bFindings reported simply as a nonsignificant result without a *p* value were not included in the secondary analyses.

^cCould not be calculated based on information in Skinner et al. (1999) review.

^dS = Sample.

Table 4

Estimated Cohen's d Sizes of Effects for Selected Study Characteristics and the Printed-Material Features

Study Characteristics	Number		Cohen's <i>d</i>	
	Studies	Effect Sizes	Mean Effect Size	95% Confidence Interval
<i>Study Focus</i>				
Dietary behavior	4	13	.27	.20-.34
Health risks	2	5	.14	.07-.21
Exercise/screenings	2	5	.40	.28-.52
<i>Type of Tailored Material</i>				
Written brochure/newsletter/letter	3	7	.24	.07-.41
Computerized letter/newsletter	3	11	.23	.19-.27
Written report/feedback	2	5	.40	.28-.52
<i>Tailored-Material Features</i>				
Personal information	3	9	.21	.13-.28
Efficacy beliefs	4	16	.29	.23-.34
Readiness for change	5	18	.25	.19-.31
Advice and guidance	5	18	.31	.25-.37
Perceived risks	3	8	.19	.10-.27
Barriers to change	4	11	.21	.15-.27
Benefits of change	4	11	.21	.15-.27
<i>Number of Tailored-Material Features</i>				
1-3	3	12	.33	.24-.42
4+	4	11	.21	.15-.27
<i>Type of Comparison</i>				
Tailored alone vs. control/comparison	5	13	.25	.17-.33
Tailored + other vs. control/comparison	2	10	.30	.21-.39
<i>Type of Outcome</i>				
Message readership/recall/credibility	5	7	.29	.16-.42
Intention to change	3	3	.28	.07-.49
Behavior	6	13	.26	.17-.35

Table 5
Percent Differences for Selected Study Characteristics and the Printed-Material Features

Study Characteristics	Number		Percent Difference	
	Studies	Effect Sizes	Mean Effect Size	95% Confidence Interval
<i>Study Focus</i>				
Dietary behavior	4	8	21	12–30
Health risks	2	7	21	13–29
Exercise/screenings	2	2	24	5–43
<i>Type of Tailored Material</i>				
Written brochure/newsletter/letter	3	10	21	15–26
Computerized letter/newsletter	3	5	22	5–39
Written report/feedback	2	2	24	5–43
<i>Tailored-Material Features</i>				
Personal information	3	8	26	19–34
Efficacy beliefs	4	7	23	13–33
Readiness for change	5	13	21	16–27
Advice and guidance	5	10	22	15–29
Perceived risks	3	10	22	15–29
Barriers to change	4	11	23	17–29
Benefits of change	4	11	23	17–29
<i>Number of Tailored-Material Features</i>				
1-3	3	6	19	10–27
4+	4	11	23	17–29
<i>Type of Comparison</i>				
Tailored alone vs. control/comparison	5	12	21	15–26
Tailored + other vs. control/comparison	3	5	24	10–37
<i>Type of Outcome</i>				
Message readership/recall/credibility	5	5	23	6–40
Intention to change	2	4	23	6–40
Behavior	4	8	20	16–24