**Study 3B**

**Method**

*Design and Procedure.* Study 3B was a 2 (level of participation during design stage: low vs. high) x 2 (level of participation during realization stage: low vs. high) between-subjects design. The task involved designing and making a picture frame from cardboard. One hundred and forty-four undergraduate students were recruited at a large private university in Turkey. All measurement scales were initially developed in English and a back-translation procedure was employed (Brislin, 1976; Cavusgil and Das, 1997).

First, participants were administered the same PPT tutorial from Studies 2 and 3A, which measured their skills in PPT ($\alpha = .86$). After completing the tutorial, they were randomly assigned to low- or high-realization and low- or high-design conditions. In the low-realization conditions, the picture frame was made for the participant by the experimenter in another room. In the high-realization conditions, identical to Study 1, participants made the picture frame following step-by-step guidelines. In the low-design conditions, the participants could not modify the picture frame. In the high-design conditions, a blank picture frame template on PPT was provided to the participants and they could design the front, back, and the stand of the frame in any way they wanted using PPT.

The low-realization/low-design condition, comprising only examining a blank frame, served as the control condition representing the baseline evaluation of the picture frame. The participants spent 3 minutes on average reading the instructions and examining the frame. In the low-realization/high-design condition, participants spent 16 minutes on average designing the frame. In the high-realization/low design condition, they spent 37
minutes on average making the frame. In the high-realization/high design condition, they spent 54 minutes on average designing and making the frame. In the low-realization/high-design condition, the final product was returned to the participant in less than six minutes. To equate the time spent with the product, participants worked on the same filler task as in Studies 2 and 3A while the picture frame was in front of them. They did so for 55, 42, and 20 minutes in the low-realization/low-design, low-realization/high design, and high-realization/low-design conditions, respectively.

Measures. All participants answered the product evaluation (α = .95), identification (α = .93), and affective commitment (α = .92) questions. Then, all participants, except for those in the low-realization/low-design condition, answered the manipulation check questions and indicated the level of effort (1 = none at all, 7 = very much) that went into the physical construction (“how much basic physical effort did you use”, “how much simple manual labor did you use”, “how much basic physical energy did you put into making the product”; α = .85) as well as the design (“how much original thinking went into making of the product”, “how much creativity did you use”, “how much did you think to make it”; α = .89).

Results.
Reported PPT difficulty levels did not differ between the low and high design conditions (F < 1). Therefore, difficulty is excluded from subsequent analyses.

Manipulation Checks. An ANOVA on reported design effort indicated a significant main effect of design participation (F(1, 117) = 31.47, p < .001), and a non-significant effect of realization participation (F < 1) levels; the design manipulation was thus successful. An ANOVA on reported physical effort indicated a significant main effect of
realization participation \( (F(1, 117) = 128.47, \ p < .001) \), and a non-significant effect of
design participation \( (F < 1) \) levels; the realization manipulation was successful.

5. Discriminant Validity for Affective Commitment and Identification Measures. As in
Studies 1, 2 and 3A, CFA and SEM revealed that measures of product evaluation,
identification, and affective commitment are distinct (see Figure A1). The model yields a
good representation of the data \( (\chi^2(11) = 15.81, \ p = .15) \). All four goodness-of-fit measures
\( (\text{SRMR} = .017, \ \text{NNFI} = .99, \ \text{CFI} = 1.00, \ \text{RMSEA} = .048) \) give a satisfactory fit, pointing to an
acceptable model. An analysis of the \( \phi_{ij} \) entries indicated that the correlation between
product evaluation and affective commitment was \( .64 \) \( (SE = .06; \ CI_{95} = .52, .76) \),
between product evaluation and identification was \( .68 \) \( (SE = .05; \ CI_{95} = .58, .78) \), and
between identification and affective commitment was \( .72 \) \( (SE = .05; \ CI_{95} = .62, .82) \). None of the confidence intervals included the value of one, providing evidence of
discriminant validity for the measures of the three constructs.

Test of Hypotheses. Replicating findings from Studies 1, 2 and 3A, an ANOVA on
product evaluation showed that the main effects of levels of participation during
realization \( (F(1, 140) = 9.19, \ p < .01) \) and design \( (F(1, 140) = 17.25, \ p < .001) \) as well as
the interaction between realization and design \( (F(1, 140) = 4.14, \ p < .05) \) were
significant. Again, we did not have an a priori hypothesis regarding the interaction;
however, we explored further what happens when consumers engage in both stages of
production by decomposing the interaction. Simple effects tests indicated that during low
levels of design participation, evaluation of the product was significantly more favorable
when realization was high \( (M = 5.34) \) rather than low \( (M = 4.24) \) \( (p < .01) \). However,
during high levels of design participation, evaluation of the product did not differ
between the high \((M = 5.80)\) and low \((M = 5.59)\) realization conditions \((p = .44)\).

Similarly, when realization participation was low, higher levels of design participation enhanced evaluation of the product \((p < .001)\). However, when realization participation was high, design participation did not enhance evaluation of the product \((p = .11)\).

An ANOVA on identification revealed a significant main effect for design participation \((M_{low} = 2.32, M_{high} = 4.14; F(1, 140) = 53.46, p < .001)\). However, the main effect of realization participation \((F(1, 140) = 1.28, p = .26)\) and the interaction effect \((F < 1)\) were not significant. As hypothesized, design participation enhanced identification with the product; however, realization participation exhibited no effect on identification.

As anticipated, an ANOVA on affective commitment revealed significant main effects for both realization \((F(1, 140) = 4.89, p < .05)\) and design \((F(1, 140) = 27.56, p < .001)\) participation. The interaction was not significant \((F(1, 140) = 1.41, p = .24)\). Participants reported higher affective commitment in the high \((M = 3.99)\) than low \((M = 3.46)\) realization condition, and in the high \((M = 4.42)\) than low \((M = 3.07)\) design condition.

To test the proposed mediations, bootstrapping analyses were conducted to estimate direct and indirect effects with two independent variables and two mediators; see Figure A2. Product evaluation was the dependent variable; realization and design participation were the predictor variables. Identification and affective commitment were hypothesized mediators for the effects of design and realization participation. Two separate models were run using bootstrapping. In each of the models, design or realization participation was specified as the independent variable and the other was treated as a covariate. Covariates are treated exactly like independent variables in the estimation, with paths to all mediators and the outcome. Including the other independent variable as a covariate in
the model corrects for the effect of the independent variable, and each model generates the desired indirect effect for the variable currently listed as the independent variable.

First, realization participation was the independent variable and design participation was the covariate. The results indicated that, when the indirect effects were included, the direct effect of realization participation on product evaluation was still significant, with a point estimate of .36 and a 95% CI of .02 to .70. However, only the indirect effect through affective commitment (indirect effect = .08, SE = .05, CI_{95} = [.003, .217]) was significant. The indirect paths through identification (indirect effect = .10, SE = .09, CI_{95} = [-.07, .30]), and through identification and affective commitment (indirect effect = .04, SE = .04, CI_{95} = [-.02, .14]) were not significant, because their confidence intervals contained zero. The impact of realization participation on product evaluation was mediated only through affective commitment. Furthermore, consistent with predictions, the path estimates from realization participation to identification (path estimate = .27, SE = .25, p = .28) was not significant whereas the path estimate from realization participation to attachment was marginally significant (path estimate = .35, SE = .20, p = .09) and from affective commitment to product evaluation (path estimate = .24, SE = .07, p < .01) was highly significant.

In the second model, design participation was the independent variable and realization participation was the covariate. The results indicated that, when the indirect effects were included, the direct effect of design participation on product evaluation was not significant, with a point estimate of -.14 and a 95% CI of -.54 to .26. The indirect effect through affective commitment (indirect effect = .04, SE = .06, CI_{95} = [-.06, .18]) was not significant. The indirect paths to product evaluation through identification
(indirect effect = .68, $SE = .17$, $CI_{95} = [.39, 1.06]$) and both identification and affective commitment (indirect effect = .27, $SE = .09$, $CI_{95} = [.11, .49]$) were however significant. Consistent with predictions, the effects from design participation to identification (path estimate = 1.86, $SE = .25$, $p < .001$), from identification to affective commitment (path estimate = .61, $SE = .07$, $p < .001$), and from affective commitment to product evaluation (path estimate = .24, $SE = .07$, $p < .01$) were significant. See Table A1 for the estimates and bootstrapping results.

In sum, the analyses indicate that the effect of realization participation on product evaluation is mediated through affective commitment only, whereas the impact of design participation on product evaluation is mediated through both identification and affective commitment. Furthermore, identification precedes affective commitment in the case of design participation.

Next, we investigated whether self-expressiveness of the design affects identification with the product. Two independent raters coded the picture frame designs made by the participants in the high-design participation conditions. The picture frames from the low-design conditions were blank frames, without any particular design, and therefore were not rated. The raters used the same scales as in Studies 2 and 3A to evaluate how self-expressive the designs were (the design is self expressive, $\alpha = .66$; one can get a sense of the designer’s personality from this, $\alpha = .65$; it reflects the designer’s self-image, $\alpha = .71$). The ratings were averaged to form a self-expressiveness index. Identification and affective commitment were regressed onto the index separately. Self-expressiveness of the design predicted the level of identification ($\beta = .31$, $t = 2.45$, $p < .05$) and affective commitment ($\beta = .28$, $t = 2.36$, $p < .05$).
Figure A1. Structural Equation Modeling Results

\[ \chi^2(11) = 15.81; p = .15 \text{ RMSEA} = .048; \text{ SRMR} = .017; \text{ NNFI} = .99; \text{ CFI} = 1.00 \]
Figure A2. Mediation Model

Path estimates represent unstandardized regression coefficients.

\( *p \leq .10, **p \leq .05, ***p \leq .01. \)
Table A1. Path Coefficients and Indirect Effects for the Model

<table>
<thead>
<tr>
<th>Study 3B</th>
<th>Path Coefficients</th>
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<tbody>
<tr>
<td></td>
<td>to Product Evaluation</td>
<td>to Identification</td>
<td>to Affective Commitment</td>
<td></td>
</tr>
<tr>
<td>from Realization Participation</td>
<td>.36** (.17)</td>
<td>.27 (.25)</td>
<td>.35* (.20)</td>
<td></td>
</tr>
<tr>
<td>from Design Participation</td>
<td>-.14 (.20)</td>
<td>1.86*** (.25)</td>
<td>.17 (.24)</td>
<td></td>
</tr>
<tr>
<td>from Identification</td>
<td>.37*** (.07)</td>
<td></td>
<td>.61*** (.07)</td>
<td></td>
</tr>
<tr>
<td>from Affective Commitment</td>
<td>.24***(.07)</td>
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| Indirect Effects | | | |
| Estimate | Bootstrap 95% CI | | |
| Independent Variable: Realization Participation | | | |
| Total | .22 | -.04, .51 |
| Specific: Realization→I→PE | .10 | -.07, .30 |
| Specific: Realization→A→PE | .08 | .003, .22 |
| Specific: Realization→I→A→PE | .04 | -.02, .14 |
| Independent Variable: Design Participation | | | |
| Total | .99 | .69, 1.35 |
| Specific: Design→I→PE | .68 | .39, 1.06 |
| Specific: Design→A→PE | .04 | -.06, .18 |
| Specific: Design→I→A→PE | .27 | .11, .49 |

Presented are estimates of the path coefficients and the bootstrapping results, parentheses contain the standard errors.

I = Identification, A = Affective Commitment, PE = Product Evaluation.

*p ≤ .10, **p ≤ .05, ***p ≤ .01.