Locus of Control and the Flow Experience: An Experimental Analysis

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The present research addresses the notion that the compatibility of skills and task demands involved in a given activity elicits a flow experience that renders the respective activity rewarding. The study employed an experimental paradigm to document the causal impact of skills–demands compatibility on the emergence of flow and revealed that participants characterized by a strong internal locus of control (LOC) were most sensitive to the manipulation of skills–demands compatibility and experienced flow under conditions of a fit of skills and task demands, whereas individuals with a weak internal LOC did not enter the state of flow. In line with previous findings, this suggests that distinct personality attributes are of critical relevance for the experience of flow to emerge.

Локус контроля и опыт потока: экспериментальное исследование.

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Данное исследование обращается к идее о том, что сопоставимость уровня навыков субъекта и требований со стороны задачи, в решение которой последний вовлечен, вызывает состояние потока, приводящее к соответствующему активности вознаграждению. Исследование использует экспериментальную парадигму для документирования причинного влияния совместимости требований и навыков на возникновения состояния потока и выявляет, что испытуемые, характеризуемые сильным внутренним локусом контроля (ЛК) оказываются наиболее чувствительны к манипуляции уровнем совместимости «требований-навыков» и способны испытывать состояние потока в условиях совпадения навыков и требований, в то время, как индивидуумы с низким внутренним ЛК были не способны входить в подобное состояние. В связи с предшествовавшими исследованиями, данный факт может свидетельствовать о том, что некоторые личностные свойства являются критически важными для возникновения состояния потока.

Гипотезы исследования: испытуемые с сильным внутренним локусом контроля бу3дут более чувствительны к манипулированию экспериментальной переменной (условиями игры: скучными, адекватными и чрезмерными) в силу их большей чувствительности к наличествующему уровню контроля, а также – большей готовности к ситуациям «вызова».

- **Метод исследования**. Participants were 122 undergraduate students (66 women) at the University of Mannheim who were offered 2 Euros for their participation. Participants played a computer game and were randomly assigned to one of three game conditions representing a boredom condition (low task demands), an adaptive condition (task demands automatically and continuously adapted to participants' level of skill) and an overload condition (very high task demands). Following the game-playing period of 8 minutes, participants completed a questionnaire designed to assess the different dimensions of flow experiences.

- **Процедура**. At the outset of the study, participants were asked to fill in a brief personality questionnaire containing the LOC scale: The German version the Internality, Powerful Others and Chance (IPC) Scale (Levenson, 1981) The 24-item IPC Scale comprises three subscales consisting of eight items each. Subjects responded to each item on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Internality Cronbach = 0.7 Chance Cronbach = 0.63 Powerful others Cronbach = 0.74

- The computer program assessed the number of lines participants were able to fill during engagement in the task which reflects the standard performance level in the Tetris game. Immediately after playing the game, participants received a questionnaire and responded to several items designed to assess specific dimensions of experiences during task engagement on response scales with end-points labeled (1) not at all true and (7) completely true.
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- **Perception of time** Participants were asked to indicate, on a horizontal line (10 cm in length) with end-points labeled very short and very long, their subjective estimate of the length of time they spent playing the game.

- In addition, they were asked to indicate their subjective estimate of the length of time they spent playing the game in minutes.

Involvement and enjoyment. Experiencing task engagement as rewarding in and of itself is the most crucial and characteristic feature of intrinsic motivation. We assessed this experience with 16 items designed to assess involvement in and enjoyment of the activity (three items of the initial questionnaire were excluded due to low internal consistency coefficients in the reliability analysis; the list of items included in the scale can be found in the Appendix). The 13-item scale was internally consistent with Cronbach's =.94

- **Perceived fit of skills and task demands and Feeling of Control scales** Perceived fit of skills and task demands ($r=0.38$, $p<0.001$): 'To what degree did the demands of the game match your ability?' (1 to 7) 'Were the demands of the game too high or too low for you?,' (1 to 7, a score of 4 reflected highest fit)

- Feeling of control - questionnaire included a 6-item scale designed to assess the perceived control over outcomes Cronbach's =0.95.

RESULTS AND DISCUSSION

1. the five assessed dependent variables represent two dimensions.
2. involvement and enjoyment as well as perceived fit loaded strongly on the first component and performance on the task and perceived control loaded strongly on the second component.

Manipulation checks.

Participants in the adaptive playing mode condition report a higher mean fit score (M=0.36, SD=0.63) than those in the boredom condition (M=0.17, SD=0.95) and the overload condition (M=0.16, SD=0.79)

Performance scores

Participants in the adaptive playing mode condition reached a higher performance level (M=18.8, SD=7.9) than those in the boredom condition (M=14.0, SD=5.3) and the overload condition (M=15.3, SD=7.0)

Perception of time

- ANOVA revealed that there was a trend towards higher scores in the two non-adaptive playing conditions (boredom condition M=56.1, SD=21.9; overload condition M=63.5, SD=21.4) compared to the adaptive condition (M=54.6, SD=21.4; F(2, 119)=2.01, p<.14).

Perceived control

- a significant effect of playing mode manipulation on perceived control scores, F(2, 119)=33.98, p<.001, reflecting a linear trend: participants in the boredom condition reached highest scores (Mj5.23, SDj1.30) and participants in the overload condition lowest scores (M=2.87, SD=1.28), with participants in the adaptive condition falling in between (M=4.52, SD=1.46).

Involvement and enjoyment

- a significant impact of the experimental manipulation, F(2,119)=8.97, p<.001; participants in the adaptive playing mode condition (M=4.77,SD=1.29) reported higher levels of involvement and enjoyment than their counterparts in the boredom (M=3.97, SD=1.46) and overload condition (M=3.50, SD=1.28).

Discussion

- perceived fit of skills and task demands functioned as a partial mediator of the playing mode manipulation effect.

Moderation analysis

- The analysis reveals the expected effect of the experimental manipulation for individuals with a high internal LOC (analyzed at +1 SD), B overload dummy =1.88, t=4.43, p<.001, B boredom dummy=1.09, t=2.57, p<.02. In individuals with a low internal LOC (analyzed at -1

SD), the experimental manipulation did not affect the task involvement and enjoyment ratings, both $t<1.55$, n.s.

Finally, our results suggest that the greater tendency of participants with a strong internal LOC to experience the activity as enjoyable and involving under adaptive playing mode conditions can at least partially be explained with reference to the fact that these participants showed a special tendency to experience control under conditions of a skills– demands compatibility.

This reflects the conceptual notion that internal LOC reflects a special sensitivity to the degree to which one's effort and/or capabilities determine experienced outcomes (Skinner, 1996).

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Table 1. Intercorrelations between dependent variables

	(1)	(2)	(3)	(4)	(5)	(6)
Performance (1)	—	.11	.14	.36**	−.19*	−.19*
Perceived fit of skills and demands (2)		—	.43***	.11	−.24**	−.15
Involvement and enjoyment (3)			—	.30**	−.44***	−.23*
Perceived control (4)				—	−.21*	−.13
Time perception (line judgment) (5)					—	.37***
Time perception (in minutes) (6)						—

Note:
*$p < .05$; **$p < .01$; ***$p < .001$.

Table 2. Factorial structure of the dependent variables

	Components	
	(1)	(2)
Involvement and enjoyment	.81	.18
Perceived fit of skills and demands	.79	−.07
Time perception[a]	−.62	−.30
Performance	.04	.83
Perceived control	.18	.77
Eigenvalues	2.04	1.08

Note:
[a]Time perception = mean index across both items (z-standardized) assessing time perception; the analysis resulted in two components with eigenvalues greater than 1 which accounted for 62.4% of the variance.

Table 3. Regressing scores on the involvement and enjoyment scale onto internal locus of control (LOC), experimental condition and interaction terms

	B	*SE B*	*β*	*t*	*p*
Constant	4.77	0.22	—	22.01	.000
Internal LOC	0.47	0.22	.33	2.15	.033
Boredom dummy	−0.80	0.30	−.27	−2.69	.008
Overload dummy	−1.27	0.30	−.42	−4.25	.000
Boredom × Internal LOC	−0.29	0.30	−.12	−.96	.341
Overload × Internal LOC	−0.61	0.30	−.25	−2.02	.045

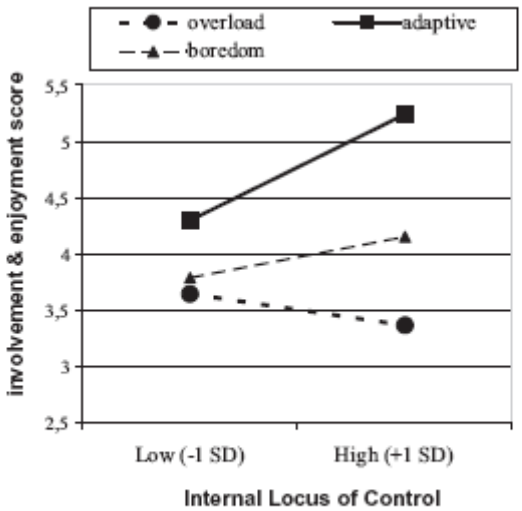

Figure 1. Graphic representation of the moderating effect of internal locus of control (LOC).