

First Impressions, Team Satisfaction and Work-Related Flow: A Multilevel Analysis

Sarah Berger, Jeffery Hanrahan, Andrea Bizarro, Robert Henning
University of Connecticut, JetBlue Airways

First impressions of fellow team members, as well as individual satisfaction with one's team, are each related to work-related flow experiences but they are rarely studied in combination. To address this gap we collected measures of all three in a laboratory study of dyadic teams (N=55). First impressions were assessed prior to the start of a management simulation task, and both team satisfaction and work-related flow were assessed afterwards. Hierarchical linear modeling revealed that measures of team satisfaction at both the individual and team levels were predictive of work-related flow experiences; an interaction between the discrepancy in first impression ratings within each team and individual ratings of team satisfaction was also found. Findings suggest that discrepancies in first impressions interact with team satisfaction in ways that may negatively impact work-related flow experiences, which in turn has the potential to impair team formation and performance effectiveness of ad hoc teams.

INTRODUCTION

There is increasing reliance on ad hoc teams in the transportation, medical, public safety, information, and military sectors. With this, individuals who have not worked together previously are regularly expected to form small teams that function effectively. For many teams in these contexts, effective functioning can mean the difference between life or death. This calls for a better understanding of how individuals react to each other when asked to join ad hoc teams, and also how their reactions might affect team outcomes.

From a macroergonomic perspective, the functioning of work systems may be understood through (1) job design, (2) hardware or software, (3) internal environmental factors, (4) external environmental factors, and (5) design factors of the organization (Hendrick, 2002). This perspective has helped researchers identify factors that promote positive team and organizational outcomes (Kleiner, 2002), and was used to guide the examination of multi-level factors in the present study.

A team is defined as "two or more individuals who... are together embedded in an encompassing organizational system with boundaries and linkages to the broader system context and task environment" (Kozlowski, & Ilgen, 2006). Teams are considered distinct from work groups, because members of teams occupy particular positions and assume specific roles and functions (Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017). A number of contextual factors, both internal and external to teams, are known to impact team members' perceptions of teamwork. It is likely that ad hoc teams that exist on a short-term basis may be particularly susceptible to internal contextual factors, including team members' first impressions of each other (Bizarro, 2013).

Both individual and team-level factors are suspected to play a role in determining when work-related flow-like experiences are reported by team members (Fisher, 2010). Flow experiences are defined as periods where individuals perceive themselves to be at peak performance, and are fully immersed in their task and are unaware of the passage of time, and also of external stimuli in their environment (Csikszentmihalyi, & Csikszentmihalyi, 1992). Ratings of satisfaction by individuals have been found to be positively related to an individual's

flow experiences (Csikszentmihalyi & Csikszentmihalyi, 1992), where individuals who are more satisfied are also more likely to report experiencing flow. Team satisfaction has also been found to be positively related to team performance (Pearsall, & Ellis, 2006), and work-related flow experiences are known to be an antecedent of improved task and team performance (Demerouti, 2006; Bakker, Oerlemans, Demerouti, Slot, & Ali, 2011).

First impressions early in a team's formation were found to play an integral role in subsequent team interactions (Bizarro, 2013), and therefore warrant research attention in the study of ad hoc teams. First impressions are determined by perceptions an individual has of another person based on their own stereotypes and interpersonal experiences as well as a comparison of their own social cues to those of the other person (Ichheiser, 1949; Bizarro, 2013). However, previous research on the impact of first impressions on teamwork has provided an unclear picture (Bizarro, 2013; McGrath, Arrow, & Berdahl, 2000; Bettenhausen & Murnighan, 1985; Tuckman & Jensen, 1977), suggesting the need to consider additional contributing factors. Macroergonomic factors can be considered, including aspects of work organization that may dictate the nature and extent of initial teamwork activities. Factors affecting initial teamwork processes would include the various modes that team members first establish joint control over the tasks at hand, which in social cybernetic terms involve some combination of the parallel, serial, and imitative modes of dynamic social tracking (Henning, Bizarro, Dove-Steinkamp, & Calabrese, 2014).

In this study, our primary focus was on team members' first impressions, their ratings of work-related flow experiences and team satisfaction, with work-related flow treated as an outcome measure of social tracking effectiveness. Our approach can be contrasted with past research, where work-related flow experience was used as a predictor or moderator of various organizational and individual outcomes (Demerouti, 2006; Demerouti, Bakker, Sonnentag, & Fullagar, 2012) and not as an outcome measure.

The current study utilized data collected from 55 dyadic teams asked to complete a management simulation task. After

a brief encounter with each other at the beginning of the experimental session, participants rated their first impressions of their teammate in private. Participants then worked together in parallel to complete the management task, and responded afterwards to survey items relating to their satisfaction with their team and work-related flow experiences. Based on the extant literature and the basis that the optimization of a work system involves both higher-order and lower-order variables, it was hypothesized that teams higher in their overall team satisfaction score would be more likely to consist of individuals providing higher ratings on the work-related flow inventory. Additionally, individuals' ratings of team satisfaction were expected to be positively related to work-related flow experiences.

H1a: Teams with higher average team satisfaction will consist of individuals that will each have higher levels of work-related flow.

H1b: Individuals who report higher team satisfaction will also report higher levels of work-related flow experiences.

Also based on previous literature, we expected that team members with more similar first impression ratings to one another (low discrepancy scores) would be more likely to report work-related flow experiences because having similar first impressions would aid the process of team formation.

H2: Work-related flow experiences reported by individuals will be inversely related to discrepancies in team first impressions.

METHODS

Participants

Undergraduate volunteers (N=110, 55 dyadic teams) from a large northeastern university received course credit for participating.

Team task

The two-person team task was adapted from a pencil and paper task designed by Devine, Habig, Martin, Bott, and Grayson (2004) in which participants were assigned roles as vice presidents of a movie studio but were provided with different information to use in deciding jointly and in a parallel manner which movies to publish from a list of options. The original task was designed for four participants (Devine, et al., 2004). In the present study, the support information was combined to create roles for two participants: VP of Marketing and Research and VP of Talent and Scripts. All information provided to participants was presented in the form of memos from a fictitious CEO of a movie studio. The general guidelines for the task were provided to participants in binders containing descriptions of 11 different screenplays, sample algorithms, and worksheets. Participants used this information to determine which movies would be most profitable, and submitted a final

recommendation sheet indicating which screenplays and marketing strategies they had jointly selected.

Procedure

The study was approved by the university's Institutional Review Board (IRB). Potential participants were informed that they would work on a business task with a partner while their heart rate and breathing signals were collected as part of a larger study (Bizarro, 2013). For a complete description of methodology see Bizarro (2013). Following informed consent procedures that participants experienced together in the same room, participants were instrumented for heart rate and breathing measurement. Next, each participant was escorted to a separate desk offering privacy for completion of the pre-experiment survey consisting of measures of stress and affective wellbeing in addition to first impressions of their teammate. They were then seated in the experiment room where task instructions were read aloud. Each participant received a binder containing the general task information, screenplay synopses, and unique information concerning their individual role on the team. Scrap paper, pens and calculators were provided to help participants organize information and think through the algorithms used to determine which movies would be most profitable. After responding to general questions not related to task strategy, the experimenter left the room and the task began. Participants were given 15 min to study their individual material and then an additional 25 min to complete the task and fill out the final recommendation sheet. Tones at pre-determined intervals alerted participants when to begin independent study of the binders, when to begin working together to complete the task, and a five-min warning before the task period ended. Participants were instructed to use all information provided in order to decide which movies to produce and how much to spend marketing each movie. Their goal being to maximize profits for the simulated business year while staying within the designated budget.

Immediately following task completion, participants completed a final survey measuring individual perceptions of team effectiveness, including: affective wellbeing, stress, individual and shared work-related flow experiences, team satisfaction, and team process. The experimenter then escorted the participants back to the original separate desks to fill out a final survey in private. The experimenter calculated team profit using the scoring worksheets provided by Devine et al. (2004) and prepared a performance feedback report that participants received before they were asked to complete the final impression measure and to assign effort ratings to themselves, their teammates, and the team as a whole.

Measures

The current study was based on data collected by Bizarro (2013) and only variables of interest are presented here.

Team satisfaction. Team satisfaction was measured using a scale developed by Lancellotti and Boyd (2008). This scale measures individual's overall interpersonal satisfaction working on the team, and with the team's outcomes.

Cronbach's alpha for this measure in terms of outcomes has been found to be .77 (Bizarro, 2013). All responses were reported on a 7-point scale from "Strongly Disagree" to "Strongly Agree". Sample items include: "I would be willing to work with this person on a class project" and "I think we produced a good budget plan".

First Impressions. First impressions were measured using measures developed for the larger study where impressions were defined as the affective liking of one's teammate. Cronbach's alpha for this measure was .84 (Bizarro, 2013). Sample items include: "I am looking forward to talking with this person" and "I like this person". All items were self-reported on a 7-point scale ranging from "Strongly Disagree" to "Strongly Agree". Discrepancies between members of each team were calculated by aggregating each participant's score. The difference between aggregated scores was then calculated by subtracting participant B from participant A. Absolute values of the difference were used as the predictor in the current study.

Work-related Flow. Work-related flow was measured using the inventory developed by Bakker (2008). Items probed participants regarding the task, and each of the 3 dimensions of work-related flow. Cronbach's alpha for this measure was .91 (Bizarro, 2013) and responses were made on a 7-point scale from "Strongly Disagree" to "Strongly Agree". Sample items include: "When I was working on this task, I thought about nothing else" and "I was totally immersed in the task".

Team Effort. Team effort was measured by asking each participant to rate on a scale of 0-100% how well they believed they performed as team. This item asked: "Please rate the amount of effort that you and your partner, working together as a team, put into completing this task".

ANALYSIS & RESULTS

Descriptive statistics and correlations of variables of interest, including work-related flow experiences and ratings of team effort, are provided in Table 1. Importantly, the outcome measure of work-related flow was significantly and positively correlated with team effort ($r=.279, p<.05$).

Hierarchical linear modeling (HLM) was used to test all hypotheses. Consistent with HLM procedures, the first step of the analyses tested the empty model (Table 2). The intraclass correlation was estimated to be .107, indicating 11% of variation in work-related flow resided at the team level, and that further hierarchical linear modeling was appropriate. Gender was included as a covariate in a subsequent model but was dropped from the final model due to lack of significance.

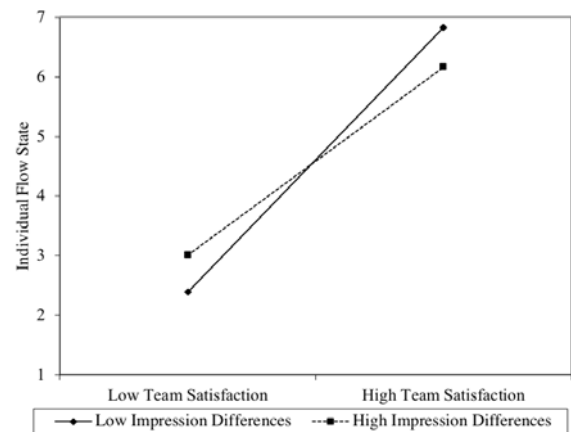
Results in Table 2 show support for both H1a and H1b. Team satisfaction at the team level was found to be positively related to work-related flow experiences (H1a), such that teams with higher average satisfaction were composed of individuals more likely to report work-related flow experiences ($\beta=.937, p<.05$). Team satisfaction of individuals was additionally found to be positively related to work-related flow ex-

periences (H1b), such that individuals who were more satisfied with their team were more likely to report being in a work-related flow state ($\beta=1.94, p<.05$).

Discrepancies in first impressions reported by individual teammates were not found to be negatively related to work-related flow experiences of individuals as posited in H2 ($\beta=-.006, p>.05$).

Interactions among key variables were also examined in the natural course of using HLM. An interaction of individuals' team satisfaction and discrepancies in first impressions was found to be related to work-related flow experiences ($\beta=-1.32, p<.05$), such that team satisfaction related to work-related flow experiences to a greater degree when first impression discrepancies were low (Figure 1). Random effects of the models are additionally reported in Table 3.

Figure 1. Interactive effect of first impression discrepancies on the relationship between team satisfaction and flow



DISCUSSION

Results in support of H1a and H1b reveal that team satisfaction significantly predicted work-related flow experiences at both the individual and team level. Both an individual participant's satisfaction, as well as the average satisfaction of both team members, were positively related to the individuals' work-related flow experiences. Therefore, one can conclude that flow experiences were closely tied to the team context in which tasks are completed, a finding similar to the one reported by Aubé, Brunelle, and Rousseau (2014) of a significant relationship between flow and team goal commitment. Such multi-level effects in a teamwork context can be anticipated based on macroergonomics theory and perspectives (Hendrick, & Kleiner, 2002).

While we hypothesized that first impressions of teammates may somehow be related to work-related flow experiences, results from the present study did not directly support this. Results instead showed an interaction between discrepancies in team members' first impressions of each other and each individual's rating of team satisfaction, an interaction which impacted work-related flow experiences as an outcome. Thus, the results suggest that discrepancies in first impressions can impact work-related flow experiences differently depending

on levels of team satisfaction. This finding corroborates previous researchers' findings that team satisfaction is positively related to individual-level outcomes (Van Der Veegt, Emans, & Van De Vliert, 2001), and this finding is also consistent with cross-level interactions whenever individuals are nested within a larger work system, as predicted by macroergonomics theory (Hendrick, & Kleiner, 2002).

One notable contribution of this study is that the results show work-related flow experiences can be investigated as an outcome measure of teamwork, even though flow constructs have been conventionally treated as antecedents or intermediary variables. Additionally, the results of this study lend further support to the notion that a discrepancy in first impressions among team members has the potential to impact an individual team member's satisfaction with their team.

The results of our analyses also indicate that discrepancies in first impressions interact with team satisfaction to impact work-related flow during teamwork, and potentially on the amount of effort expended by the team because work-related flow experiences were positively and significantly related to team effort. Nearly a 1-point scale difference in the work-related flow experiences occurred when there were high discrepancies in first impressions, and either low levels of team satisfaction or high levels of team satisfaction, and so this can be considered an effect size of practical significance.

Our present focus on mechanisms preceding flow experiences invites consideration of macroergonomic factors that might contribute to team satisfaction as well as support positive interactions among co-workers during the initial stage(s) of team formation. One can also consider which factors could help support establishing and maintaining work-related flow in order to benefit overall team performance. A number of practical implications can be considered as well once organizations acknowledge that team members' first impressions of each other can matter, with a low discrepancy in ratings making it more likely that the team will be effective. Ensuring a high initial level of satisfaction within the team can also be expected to increase team productivity. Teams with a low level of satisfaction or high discrepancy of initial first impressions may warrant remedial interventions.

Future Directions

The current study is unique in that we were able to show that investigating antecedents to work-related flow experiences can be informative, whereas previous researchers have largely conceptualized work-related flow as a predictor of behavioral outcomes. Nonetheless, the present findings need to be replicated due to the relatively low statistical power of our analyses. Additionally, participant age was relatively homogeneous across teams. Lastly, a better understanding of the underlying causal, feedback and feedforward control relationships could be gained by examining the effects of the different modes of social tracking in small and larger teams, and in longer task periods in a variety of work contexts.

Focusing future research on ways to reduce first impression discrepancies among teammates may also be instrumental; the general idea being that team members who have more

similar impressions of one another may subsequently have more positive interactions during their time working together, and better overall teamwork experiences. One possibility is to design team tasks and work environments to facilitate more positive initial team member interactions as a way to reduce or offset discrepancies in team member first impressions, possibly by having the team immediately engage in modes of social tracking that are prerequisite to the tasks at hand. According to Nguyen, Seers, & Hartman (2008), individuals' successful ingratiation to teammates can lead to positive first impressions between team members, and this may contribute to higher team satisfaction later on. Although we did not conduct supplemental analyses to distinguish discrepancy scores on the basis of shared positive or shared negative impressions, the results of the present study overall suggest that the impact of first impressions among team members on team flow and performance merits further study when the performance of ad hoc teams is of critical importance.

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Table 1. Descriptive Statistics

Measure	M	SD	1	2	3	4	5
1. First impression discrepancies	-.001	.605	1	-.001	-.043	-.011	-
2. Team Satisfaction (Individual)	.000	.290	-.001	1	.000	.178	-
3. Team Satisfaction (Dyad)	-.002	.275	-.043	.000	1	.279*	-
4. Work-related flow	4.56	.916	-.011	.178	.279*	1	-
5. Team effort	88.62	9.571	-	-	-	.279*	1

Note. *p<.05

Table 2. Fixed Effects of HLM models

	Empty Model			Model 5			Model 6		
	Coeff	SE	t	Coeff	SE	t	Coeff	SE	t
Intercept	4.56	.092	49.49*						
Intercept				4.57	.177	25.81*			
Team Satisfaction (Individual)				.562	.278	2.02*			
Discrepancies in First Impressions				-.003	.141	-.021			
Team Satisfaction (Dyad)				.931	.318	2.93*			
Intercept							4.57	.176	25.92*
Team Satisfaction (Individual)							1.94	.612	3.17*
Discrepancies in First Impressions							-.005	.140	-.041
Team Satisfaction (Dyad)							.937	.321	2.91*
Team Satisfaction X Discrepancies							-1.32	.530	-2.49*

Note. *p<.05

Table 3. Random Effects of HLM models

	Empty Model			Model 5		Model 6	
	Var.	SD	Var.	SD	Var.	SD	
Intercept	.095	.308	.060	.245	.106	.326	
Random Effects	.746	.864	.710	.842	.635	.797	