Fostering Psychological Safety in Teams: Evidence from an RCT

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This version: June 2022

Abstract

Psychological safety (PsyS) is an important driver of teams' performance and organizations are keen to foster it. However, there is little causal evidence on what drives it and how to increase it. This paper implements a randomized control trial with over1000 teams (over 7000 employees) in a global healthcare company to evaluate the impact of individualized attention of the manager to each team member team by encouraging managers to hold frequent 1-to-1 meetings and to focus them on mechanisms expected to increase PsyS. We exogenously vary the content of those meetings: focusing on employees' needs and aspirations as individuals, or on allowing employees' to better execute tasks and remove blockers that may hinder their best work. We find that, despite this very non-invasive intervention, the behavior of managers changed as they increased the number of meetings. PsyS also increased as did the relationship to and perceptions of the manager, particularly in the treatment arm that focused on the employees' individual needs.

* Our most sincere thanks to all those who made this project happen in true cross-functional team collaboration spirit: to Zsofia Belovai and James Elfer at MoreThanNow and to Stefanie Nickel, Frank Kellenberg, Antoine Ferrere, Chris Rider, Baiba Renerte, Julia Osl, Alicia Toeplitz along many others at Sandoz/Novartis.
This project was pre-registered in the AEA RCT Registry (0008359) and received IRB approval by the INSEAD Ethical Review Board.

I. Introduction

Teams' importance in organizations is ever-growing as firms face an increasingly volatile and uncertain environment: multi-functional teams are formed to cope with complexity and provide adaptive and innovative responses. It is by now well established that psychological safety (PsyS) -- the shared belief that a team is safe for interpersonal risk taking -- is an important driver of a team's dynamics, learning, innovation, and performance (cf. Edmondson, 1999; and Edmondson and Lei, 2014, for reviews). Organizations across the board are spending significant effort and resources to foster it within their ranks. However, too often the recommendations for how to increase PsyS are relatively generic (Delizonna, 2017) and there is little causal evidence on what works in practice.

The theory of antecedents and consequences of PsyS is well established and there is a lot of empirical work on the correlates of the construct (see e.g. Edmondson and Lei 2014, Frazier, et al. 2017, Newman et al., 2017 for reviews). However, to our knowledge there is no causal evidence from the field on the drivers of PsyS and limited knowledge on what type of actions firms can take to foster it. It is also unclear whether this is a slow-moving construct that can only be changed in the long term along with general cultural change, or if there are short interventions that can strengthen it quickly.

This paper implements a randomized controlled trial, with around 7000 employees in 1000 teams in a large organization to test the role of a key antecedent of PsyS, namely leadership behavior, and whether it can be influenced successfully. For example, team leader coaching (Edmondson, 1999) and inclusiveness (Nembhard and Edmondson, 2006) have been identified as predictors of team PsyS. We evaluate the role of individualized attention of the manager to each employee in their team as a driver of PsyS and test for the effectiveness of different forms of attention.

Our experiment uses the content and frequency of 1-to-1 meetings as the conduit to change the behavior of the team leader, henceforth manager, with her team. This builds on research that has found that leader behaviors of support and inclusiveness foster PsyS, which we try to increase through the 1-to-1s. In the two treatment arms (T1 and T2) managers receive an email about the importance of 1-to-1 meetings, they are reminded to run these regularly, and to use them to focus

on the individual and on improving psychological safety. They also receive a one-pager PDF that provides guidance on what to focus on and how to run the meetings. Managers randomized into T1 received a PDF that encourages them to focus on individuals by allowing them to express their needs and aspirations at those meetings (*needs* treatment). The inclusiveness in this treatment uses results by Kim (2017) who found that a treatment that acknowledges the individual needs led to higher PsyS in a lab experiment with online participants. Managers in T2 were also encouraged to create inclusiveness by focusing on individuals, but the PDF they received guided them to focus on helping them to better execute tasks and remove blockers that may impede workers from being effective at their job (*tasks* treatment). The *tasks* treatment is motivated by research from social psychology highlighting the importance of goal clarity and project-organization goal alignment (e.g., Chandrasekaran and Mishra, 2012). Managers in the control group (C) were only notified that the firm was conducting a study on meeting habits with no mention of PsyS or 1-to-1 meetings.[1]

We designed the experiment to collect data at the team level so that it would blend into the normal operations of the organization and be as much part of its routines as possible. The firm conducts regular surveys on both team and organization-wide aspects of culture. We timed the experiment to take place over 6 weeks between two survey waves in the fall of 2021. Our sample is the set of teams randomized into treatment with at least five responses per team, who responded to both baseline and endline surveys. We also obtained archival data on a subset of teams about their meeting frequency from Microsoft Workplace Analytics and ran a survey of meeting habits for a broader set of employees. All the communication with managers and employees was done by the firm's leadership, and designed in close collaboration with the communications department. The firm had been actively trying to foster PsyS through many initiatives, so this study was naturally perceived as part of the organization's wider efforts to reinforce the validity of the initiatives.

The interventions themselves were rather non-invasive, consisting only of a few emails and reminders with PDF attachments that managers were free to act upon, and not requiring costly, extensive training. The advantage of this is that we know exactly the information that each manager

[1] Note that our two treatment arms speak directly to arguments brought forward in Bresman and Edmondson's current (March 17, 2022), HBR contribution where they argue, that the three key contents of conversations within teams, that foster PsyS are: "Hopes and goals. What do you want to accomplish?", "Resources and skills. What do you bring to the table?", and "Concerns and obstacles. What are you up against? What are you worried about?". Treatments *needs* and *task* address directly topics 1 & 3 and are the first to causally address these. (*https://hbr.org/2022/03/research-to-excel-diverse-teams-need-psychological-safety*)

was receiving; the disadvantage of such an encouragement treatment is that managers could have completely ignored the communications. That is, we are in an intent-to-treat setting with the identified treatment effect likely being attenuated.

As a manipulation check of whether the intervention influenced behaviors, we test if the treatments modified meeting frequency. We find that in spite of the low intensity of the intervention there was indeed a change in behavior by managers: the emails suggesting to increase managerial attention and 1-to-1s led to more frequent meetings, in particular in treatment T1 (*needs*). Even though we cannot know the exact content of the 1-to-1 conversations, this suggests that our manipulation had an impact and that at least some managers followed the email recommendations, i.e. complied with the intended treatment.

Turning to our core results, we find that the interventions increased PsyS within the team, in particular in treatment T1 (*needs*). Receiving the encouragement to focus on the individual's needs led to a significant 1.82 points increase in PsyS, which is a 2.2% increase evaluated at the control baseline mean. Receiving the treatment T2 (*tasks*) also led to a positive, albeit smaller and not statistically significant effect on team PsyS.

Interestingly, we find effects only when we focus on team level outcomes, and not on the organization-wide outcomes. The effect on team PsyS (and other team outcomes) does not translate, for example, into feeling more able to speak one's mind at the organizational level (speaking one's mind has been shown as a core outcome of strong PsyS, and is often used as a proxy) or on organisational engagement and attachment. The treatments change how the employee feels in the team, but not in the organization more widely.

We also find that the mean positive effect of our treatments on PsyS is the result of some interesting heterogeneity. The impact of the treatments depends on the initial levels of PsyS of the team: focusing on the individuals' needs (T1) was useful for all teams but in particular for those with initially low levels of PsyS. T2 (*tasks*) was in turn most useful for teams with intermediate levels of the PsyS metric at baseline. We interpret these results as suggesting that nudging the managers to focus on the individual in these meetings is useful. However, the focus on individual needs is particularly useful for managers of teams with lower shared feeling of safety to begin with, where the rapport with the team leader needs to be built and an atmosphere of openness and support needs to be established. As PsyS develops and becomes stronger in the team, continuing to focus

managerial attention on the individual and talking about job effectiveness and tasks is positively affecting our PsyS outcome. In other words, focusing on task effectiveness without a minimal level of PsyS in the team is not as valuable. In terms of policy recommendations to organizations, this suggests a natural ordering in how managers can build PsyS in their teams.

Finally, we also capture other changes at the team level using the survey about team perceptions. We find that the *needs* treatment (T1) also changed the nature of the relationship with the manager: employees felt more supported by the manager and were more likely to report that they experienced their manager as a role model. These are important outcomes for companies in and of themselves, and it is noteworthy that our non-invasive intervention was able to support leaders into transforming how their team members perceived them. These results, remembering the importance of leadership behaviors, also suggest a mechanism through which PsyS emerges.

The randomization ensures that the drivers of the effects are not differences in managers' personality, team structures, or other dimensions that have been hypothesized as antecedents of PsyS, nor by reverse causation from the construct to leadership: it is really driven by the change in and content of the 1-to-1s. We are thus able to causally establish one important antecedent of PsyS, and show that it can be manipulated with a relatively simple intervention, in the short run at least, so that one can be cautiously optimistic on its malleability.

II. Framework

1-to-1 meetings as a way to deliver the message.— Careful observational studies have shown the importance of leadership behavior in fostering team PsyS (Edmonson, 2004; Nembhard and Edmondson, 2006; Hirak et. al. 2012). Our study, builds on the literature that studies the leader, i.e., the managers, as the potential change maker of the perceived level of PsyS inside the team. We use 1-to-1 meetings, a setting where there is direct and close interaction between the manager and team member, to change behaviors that team members can directly observe and experience. Variation in the leader's effectiveness can come from the content of these meetings. Empirically, different types of inclusive leader behaviors have been linked to PsyS: supportive management and context (Carmeli & Zisu, 2009; Edmondson, 1996, 1999), being available and accessible, inviting input, modeling openness and fallibility (Edmondson, 2004; Nembhard). Our treatments will focus on two very specific behavioral changes and test their effect. We turn to those next.

Better 1-to-1s increase PsyS.— To test the effectiveness of encouraging managers to increase PsyS through 1-to-1 meetings we nudge them to focus on two specific behavioral changes that focus on inclusiveness but through two different dimensions. We test two specific interventions. T1 (*needs*), where the manager receives concrete guidance to focus on the employee's needs as a person and what is important for them as an individual. T2 (*tasks*), where the manager receives guidance to focus on the employees' needs as a worker, supporting the individual in removing barriers for realizing their best work.

T1 (needs).— Experimental research in social psychology has shown a direct and positive link between individuation, a view that organizational members are all unique individuals, and PsyS (Kim, 2019). Additionally, a survey in the firm carried out in 2021 showed that there is a positive association between employees' individual needs and the perception of PsyS.

T2 (tasks).— The last pulse survey in the firm (2021) found that teams with increased goal conflicts exhibited lower PsyS. This is in line with research from social psychology highlighting the importance of goal clarity and project-organization goal alignment (Chandrasekaran and Mishra, 2012). The firm concluded that there is a need to aid employees in their planning and prioritization process. By encouraging discussion about conflicts, managers are inviting employees to speak up about their concerns, and about what holds them back from realizing their full potential.

III. Experiment

Setting.—The experiment took place in collaboration with a major pharmaceutical firm, Sandoz/Novartis (henceforth, the "firm") which has headquarters in Switzerland and teams spread all over the world. The experiment took place between the months of September and November of 2021 (see detailed timeline in Figure 1). 1.019 teams and more than 7.000+ employees were part of our study; the workers in our sample can be classified as knowledge workers, performing non-routine analytical tasks. The only criteria that was applied to select the teams within the firm was that they had participated in the previous wave of the organizational survey.

Encouragement Design.— The 1.019 teams were randomized into three groups: 339 teams were assigned to the control group, 340 teams to T1(*needs)*, and 340 teams to T2 (*tasks)*.

The experiment started on September 9th, 2021, with an email addressed to the team managers. All communications were done via the firm leadership. Managers in the control group received a kick-off email from the "Meeting Habits Study Team" where they were informed that a study was taking place about meeting habits in the firm, and permission was requested to use their data at an aggregate level (see Figure 1A in the Appendix for the exact phrasing). The control group did not receive any further communication after that until the end of the experiment.

Managers in the two treatment arms received an email with more extensive information. They were informed that a study was taking place to explore the effectiveness of 1-to-1 meetings and how to use those meetings to foster PsyS. They also received the choice to opt out of the study (see exact content of the communication in Appendix Figure 2A):

> *We would like to ask your support on a joint study to explore the effectiveness of 1:1 conversations with your team members. As we continue to progress in creating psychological safety, our aim is to develop a deeper understanding of how our conversations can impact team dynamics, performance and well-being […]. Each 1:1 conversation is an opportunity to ensure a psychological safe space for associates to collaborate effectively, be bold in sharing big ideas as well as perceived barriers, and provide the tools needed to enhance performance, well-being, and curiosity. […] As we are sure you already conduct 1:1 meetings with your team members, incorporating the new tools and techniques into your schedule will be a light lift.*

The email from the top management provides a signal to the managers that increasing psychological safety is an important goal for the firm ("as we continue to progress in creating psychological safety"). The communication asks managers to invest more time in the 1-to-1 meetings and to strengthen PsyS within their teams ("Each 1:1 conversation is an opportunity to ensure a psychological safe space") and informs them that they will receive information on techniques that will help them do so ("incorporating the new tools and techniques into your schedule will be a light lift").

Content of the 1-to-1 meetings—. In the next communication, the managers of teams in the two treatment arms received details about one of the two treatment conditions (see appendix Figure 3A for the detailed content). The body of the email to both groups described that the goal of the study was *to develop a deeper understanding of how the quality and frequency of 1-to-1 conversations affects team dynamics.* During six weeks managers were asked to set up recurring weekly 1-to-1 meetings with their team members, acknowledging that most managers already hold these meetings. Attached to the email, there was a one-page PDF with suggestions on what to focus on in those meetings. The content of the PDF differed by treatment arm. The treatment arms received two more reminders afterwards, fortnightly. During the time of the study, the communications and reminders had the same content for both treatment arms; however, they varied on having attached a different PDF depending on the treatment arm.

The treatment group *needs* (T1) received regular email correspondence about conducting 1-to-1 meetings with a focus on appreciating the respective needs and perspectives of each individual team member. In the first communication (and also attached in the reminders), they received a one page PDF that provided a guide on how to discover and adapt to the individual needs of the team members. The header of the PDF said "Use your 1:1 time to discover and adapt to the individual needs of your team". It further said: "Over the next six weeks we want you to make space in your 1:1 meetings to focus away from day-to-day work and towards what matters most to your team member in the long run, so they feel like unique individuals within the larger organization". The PDF then recommended some concrete behaviors to role model ("Invite Insight", "Be Empathetic", "Ask Questions") and give an example of how they can do each of them. For example, under "Invite Insight" it said "Ask your team members to come to your next 1:1 meeting with a topic that is meaningful to them. This could be anything from maintaining work-life balance to career aspirations to relationships within the team. Plan to work on it together over the six-week period." (see appendix Figure 4A for the exact PDF content).

The second treatment group, t*asks* (T2), received the same email correspondence about conducting 1-to-1 meetings, but their attached PDF was different and focused on how to best execute tasks,

removing barriers and distractions that would hinder people in making their most valuable contribution. Managers received a pdf that said "Use your 1:1 time to remove barriers and distractions from people making their most valuable contribution". Paralleling the needs treatment, the PDF said: "Over the next six weeks we want you to focus your 1:1 time on making your team's lives simpler. This means exploring what is in the way of their best work. Whether competing goals, unnecessary or deprioritized project over process, systems or technology issues". It then provides some concrete guidance on how to structure a conversation around prioritizing tasks and removing barriers by focusing on the team member. The objective was to encourage the managers to focus on how the support each employee in performing her tasks effectively, and remove those obstacles important to the respective team member. The goal was to unlock potential by removing barriers and distractions that are under the control of the team (see appendix Figure 5A).

Outcomes and data.—For the study, the firm provided survey data from the two internal surveys: one that measures employee's perceptions of the team and another that measures employee's perceptions of the firm as a whole. The survey data is available for the waves directly before and after our intervention. Due to internal firm privacy restrictions, the variables were provided as averages at the team level for those teams where at least five employees participated in the survey. Additionally, to understand changes in behavior, the firm provided Microsoft Workplace Analytics data for the average number of meetings that each manager held with their direct reports in the months of June and November of 2021. Moreover, a survey on meeting habits at the treatment level was conducted by the researchers directly. Lastly, the firm provided anonymized administrative information at the employee-level with demographics data and location of the teams.

Our principal outcome measure is psychological safety measured at both the team and organizational level. The team level PsyS is the team average of two survey questions that closely replicate the metrics of the construct in organizational psychology (Edmondson, 1999): *Different perspectives are valued in my team* and *I feel safe sharing feedback with colleagues*. The participants were asked to provide, on a scale from 0-100, their level of agreement with the respective statement. The organizational level PsyS is the team average of the survey question *I feel free to speak my mind without fear of negative consequences.* The two measures come from two

different surveys; the first from the survey aimed at eliciting attitudes about the team, and the second from the survey aimed at measuring employees' perceptions regarding the entire organization.

In addition to our main outcome variable, we document in this study effects of the treatment in other metrics directly related to the manager-employee relationship, and to employees' perceptions about the firm and their work. For that, we report results from eight additional variables: four related to the team and four related to the employees' perception of the firm (for a detailed description of the variables see Table A2 of the Appendix).

Lastly, changes in managers' behavior is measured through the number of 1-to-1 meetings that each manager held on average with each subordinate. For that, we use two metrics. The average number of meetings obtained from the Microsoft Workplace Analytics data for the months of June and November for a subsample of teams. Teams from some European countries had to be excluded due to data protection constraints within the respective Country organizations, and only those teams that participated in the survey were considered. Additionally, we use a survey that was deployed only at endline and that is available at the individual-treatment level (and not in terms of team averages like the previous metrics). In this survey, the question *Reflecting on the last couple of months, how frequently do you have 1-to-1 meetings with your manager?* The answers ranged from *less than once every two months* to *more than once a week.* The response rate for this survey was 24% (2.109 individual responses out of 8.871).

The randomization worked and observable characteristics are well balanced (see Table 1A in Appendix). Response rates to the surveys at baseline are 76% and 79% for the team and organizational survey respectively. For endline, response rates are 62% and 74%.

IV. Results

To estimate the effect of treatment assignment on PsyS, as well as other variables the organization routinely measures, we run regressions with the following specification:

$$(1) \qquad (Y_1 - Y_0)_i = \alpha + \beta T_{1i} + \gamma T_{2i} + \delta_{0i} + u_i.$$

$(Y_1 - Y_0)_i$ is the difference in the outcome between baseline and endline at the team level i. T_{1i} (T_{2i}) is a dummy variable that indicates assignment to T1 (T2), the *needs* (*tasks*) treatment. β is therefore the intent-to-treat estimator of the impact of *needs* on the change in outcomes once controls for differences at baseline (δ_{0i}) have been included. γ is the equivalent for the *tasks* treatment. u_i is the error term. Given the randomization, β and γ can be interpreted as the causal impact of assignment to treatment. Two types of controls are included in the specification: survey controls that incorporate the baseline level of PsyS and the variable *trust;* additionally, the baseline levels of the outcome variable (when it is not PsyS). Secondly, demographic controls are included (the team's female share, size, and age dispersion within the team).

Frequency of 1-to-1 meetings.— The first question that we aim to answer is whether the intervention lead to a change in the behavior of the managers. For that, in Table 1, we test the effect of the email encouragement on the number of 1-to-1 meetings between managers and employees during the time of the study. We observe an increase in the average number of 1-to-1 meetings for the *needs* treatment both in the survey data (significant at the 1% level) and in the Workplace Analytics data (significant at the 5% level).[2] Specifically, in *needs* there is an increase in the average number of meetings per month of 0.335 when compared to the control group, which evaluated at the baseline control mean indicates an increase of 23%. This means that our treatments were effective in changing at least one dimension of behavior which we explicitly aimed to encourage: the number of 1-to-1 meetings. While behavior might have changed even without a change in 1-to-1 meetings, the fact that we observe behavioral changes serves as a manipulation check (and suggests our emails were not just ignored).

[Insert Table 1 here]

Main effect on PsyS.— Having established that the treatments did lead to some changes in behavior by managers, we turn to analyzing the effect on PsyS in Table 2. We have two different measures capturing PsyS, one at the team level and one at the organizational level. Columns (1) - (3) in Table 2 use change in team level PsyS as the dependent variable, while column (4) uses the organization

[2] Note that the Workplace Analytics sample is substantially smaller as some of the larger country organizations cannot share or access these data due to agreements with their local employee representation.

level PsyS (speak my mind) variable. Columns (1) - (3) indicate that the treatments have a positive effect on the change in average PsyS within the team. The effect is statistically significant at the 5% level for the *needs* treatment and robust to including a variety of demographic controls and weighting as the variables are team averages. Specifically, in *needs* the endline change is 1.82 larger than in control, where PsyS at baseline has a mean of 82.85 points (on a scale from 1 to 100) and a standard deviation of 11.72 points. Therefore the *needs* treatment led to an increase in PsyS of 16% of a standard deviation, or 2.2% of the baseline control mean. The change in Response to *tasks* is also positive, albeit smaller (less than half the size, at 0.834 points, the increase is of 1.01% of the baseline control mean) and not statistically significant. In contrast, Column (4) shows that the intervention does not increase perceived PsyS at the organization level. T1 has a coefficient of 0.042, which is close to zero, so we interpret this as actual null effects. T2 has also a smaller and insignificant effect on the organizational level, that if anything is negative (-0.578).

[Insert Table 2 here]

Overall, we find that both treatments led to a meaningful increase in PsyS at the team level, particularly for the *needs* treatment. This suggests that 1-to-1s can be an effective tool for leaders to affect the level of PsyS in the team, and that PsyS is a dimension that can be affected in the short run through focused conversations and some guidance on how to hold those, and does not necessarily require large culture changes. The fact that we see no effect on organizational level PsyS suggests that the improved dynamics at the team level do not automatically translate to the organizational level. The randomization also ensures that the drivers of the effects are not differences in managers' personality, team structures, or other dimensions that have been hypothesized as antecedents of PsyS, nor by reverse causation from PsyS to leadership: it is really driven by the change in and content of the 1-to-1s.

Heterogeneity.— Having tested for the average effect of out interventions, we next turn to consider more carefully initial conditions: we evaluate whether the positive effect on average of our treatments depends on the initial levels of PsyS in the team. Columns (2)-(4) in Table 3 show the treatment effects by baseline tercile of PsyS. First, we observe that the intervention had only a very minor and imprecisely measured effect on teams that started out with the highest baseline level. This stands to reason as these teams already scored above 90 out of 100 and hence there are natural

ceiling effects. So this serves as a manipulation check and also shows there is no regression to the mean.

[Insert Table 3 here]

We find interesting heterogeneity for teams in the two bottom terciles: We observe that the *needs* treatment was particularly effective for teams in the lowest tercile at baseline; it was also effective although less so in the middle terciles (note that as we break the sample down into subgroups, we have fewer observations and hence have less statistical power to find statistical effects)

In contrast, while the treatment effect for *tasks* was less pronounced and less precisely estimated looking at the entire sample, we see that in fact it was very effective for teams with initially intermediate levels of PsyS. A potential interpretation of these results suggests that focusing on the individual needs is a pre-requisite and a first point of intervention for teams with low PsyS. As PsyS is stronger, the value of focusing on needs is lower (maybe because managers are already doing it) and the value of focusing on other dimensions such as task execution is more valuable. Given our design we are not able to test the effect of both at the same time, but these results point to an interesting potential complementarity between both treatments and a clear direction on what intervention to use depending on the team initial metrics of perceived safety.

Employees' perceptions about the team.— While our study was designed to study PsyS, with the organizational and team surveys we are able to test what else is (and is not) changing in the teams. Table 4 shows the results. We generally observe a positive effect of the intervention on variables at the team level related to the relationship between employee and manager. In Column 1 (*Support*), we find that the needs treatment significantly increases the employee's perception that the manager is supportive (in terms of career development and coaching). T2 also has a positive but not as strong effect. Similarly, Columns 2 and 3 show that T1 changes the employees' perception of their manger: they are more likely to see them as a role model and to recommend them as a manager. Beyond the impact on PsyS these are interesting outcomes in and of themselves for organizations. Lastly, we observe a positive but statistically insignificant change in relation to how the worker thinks of how safe it is to be creative and to take risks at work. It appears that what is changing more directly is

the personal relationship between the employee and the manager rather than the perception of the worker about her tasks and work. As the metrics were obtained shortly after the 6 weeks intervention, it is likely that changes in perceptions indirectly relate to the 1-to-1 meetings while trying out new ways to tackle tasks might require trial and error and thus might need longer to be captured in a survey.

[Insert Table 4 here]

Employees' perceptions about the organization as a whole.— Table 4 shows the survey measures from additional variables related to the firm as a whole, and not in reference to the team. These are the sense of belonging to the firm, engagement, whether the employee would recommend the firm, and trust (shown in Columns 5 to 8). We can observe, by the generally smaller size of the coefficients and the lack of statistically significant effects, that none of the interventions strongly affects the perceptions of the employees about the firm as a whole, while it affected several team level characteristics. These results are in line with previous observational studies in organizational psychology that suggested the existence of different dynamics of the PsyS construct within and across teams (Bienefeld & Grote, 2014).

V. Conclusion

This paper contributes to the literature on PsyS by being the first to causally test the impact of a PsyS intervention in a real organization with a randomized field experiment (RCT). This allows us to establish causal evidence for the antecedents of PsyS, as well as to establish interventions that work. Fostering high performing teams is ever more important as firms resort to more agile ways of organizing increasingly volatile and uncertain environment - and PsyS is a core pathway of managing performance of these teams. Hence, our study is an important, timely contribution enabling organizations to develop a minimally invasive protocol, which inserts itself in the normal company operations but provides rich and valuable insights towards evidence based management with direct managerial applications and measurable effects.

VI. References

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VII. FIGURES AND TABLES

FIGURES

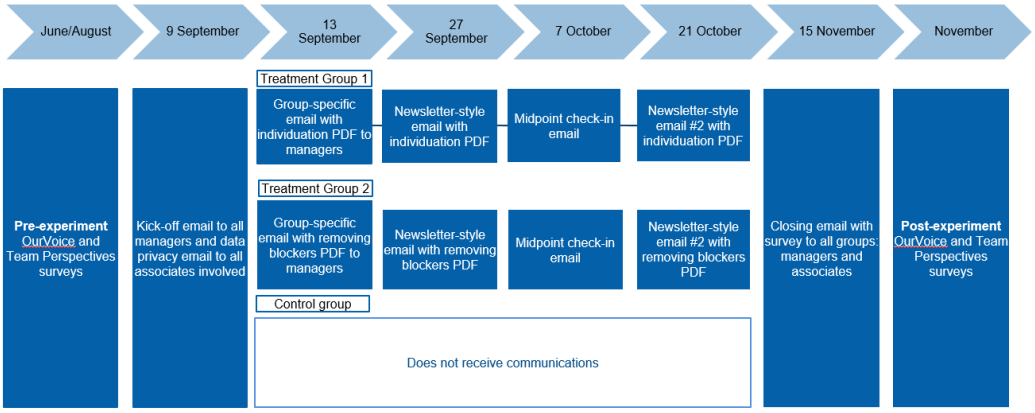


Figure 1: Timeline of the experiment

TABLES

Table 1: Effect of treatment on the number of meetings

	(1)	(2)
	Frequency of Meetings	
	Self-reported	*Workplace analytics*
Needs (T1)	0.280***	0.398**
	(0.103)	(0.180)
Tasks (T2)	0.185*	0.0364
	(0.101)	(0.173)
Baseline WPA		-0.173**
		(0.077)
Constant	n.a.	0.426
		(0.942)
Control mean of dep . var		1.44
Demographic controls	No	Yes
Survey controls	No	Yes
Observations	1831	138

Notes: Robust standard errors in parenthesis. * p<0.10, **p< 0.05, *** p<0.01
Coefficients in column (1) are estimated using ordered logistic regression. They measure the answers to *Reflecting on the last couple of months, how frequently do you have 1-to-1 meetings with your manager?* Answers go from *less than once every two months (=1)* to *more than once a week (=6).* Survey answers are provided at the individual level and compared across treatments (with no team information). Coefficients in column (2) are estimated using OLS. The workplace analytics data it is the average at the team level of the number of 1-to-1 meetings a manager had with each direct report over the one month period of June and November. The results exclude teams located in Austria and Germany and those teams that did not answer the psychological safety question at the Team Perspectives survey. *Control mean of dep. var* includes the mean for the control group at baseline. *Survey controls* include baseline level of psychological safety, baseline level of trust. *Demographic controls* include the ratio of female in the team, the team size, and the age dispersion in the team.

Table 2: Effect of Treatment on Team and Organizational Psychological Safety

	(1)	(2)	(3)	(4)
	Team Level			*Organizational Level*
	Change in Psychological Safety			
Needs (T1)	1.649**	1.823**	1.603**	0.246
	(0.770)	(0.751)	(0.775)	(0.952)
Tasks (T2)	0.798	0.834	0.704	-0.593
	(0.804)	(0.797)	(0.768)	(0.941)
Constant	14.11***	13.79***	15.89***	0.642
	(3.925)	(4.393)	(3.968)	(4.386)
Control mean dep. var	82.85			74.09
Survey controls	Yes	Yes	Yes	Yes
Demographic controls	No	Yes	Yes	Yes
Weighted	No	No	Yes	No
Observations	517	508	508	559

Notes: * p<0.10, ** p<0.05 *** p<0.01. OLS estimation on the change in psychological safety. Columns (1)-(3) show the employees' perceptions in relation to the team, column (4) shows the changes in perceptions in relation to the firm as a whole. Column (1) includes survey controls and column (2) adds demographic controls. In column (3) the OLS includes analytics weights by team size. *Team PsyS* is measured through the level of agreement from 0-100 to the statements *I feel safe sharing feedback with colleagues,* and *Different perspectives are valued in my team. Organization PsyS* is measured through the level of agreement from 0-100 to the statement *I feel free to speak my mind without fear of negative consequences. Control mean dep.var* reports the mean at baseline for the control group. *Survey controls* include *baseline PsyS* level and baseline level of *trust* (from organizational survey). *Demographic controls* include *the ratio of women on the team, the team size and the team age dispersion*

Table 3: Effect of Treatment on Team Psychological Safety by Baseline Level of Psychological Safety

	(1)	(2)	(3)	(4)
	Full Sample	*Terciles of Baseline Team PsyS*		
		Bottom Tercile	*Middle Tercile*	*Top Tercile*
	Change in Psychological Safety			
Needs (T1)	1.823**	4.359***	2.353**	-0.712
	(0.751)	(1.569)	(1.097)	(1.191)
Tasks (T2)	0.834	0.417	3.030***	-1.199
	(0.797)	(1.815)	(1.107)	(1.152)
Constant	13.79***	13.05	10.67	-7.259
	(4.393)	(9.367)	(13.07)	(14.64)
Survey controls	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes
Weighted	No	No	No	No
Observations	508	162	190	156

Notes: * p<0.10, ** p<0.05 *** p<0.01. OLS estimation on the change in psychological safety. Column (1) shows the change to the full sample measured from a range from 0-100, being 100 the highest level of agreement with the statements elicited. Columns (2)-(4) show the results split by terciles. *Survey controls* include *baseline psychological safety and the baseline level of trust. Demographic controls* include *the ratio of women on the team, the time size and the team age dispersion*

Table 4: Effects of Treatment on Perception Changes at the Team and Organizational Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Team Level Perceptions				*Firm Level Perceptions*			
	Support	**Role Model**	**Recommend Manager**	**Innovative**	**Belonging**	**Engagement**	**Recommend Firm**	**Trust**
Needs (T1)	2.16***	1.85**	1.71*	1.03	-0.34	0.12	0.31	0.32
	(0.77)	(0.84)	(0.92)	(0.65)	(0.86)	(0.71)	(0.79)	(0.77)
Tasks (T2)	0.66	0.94	0.97	0.77	-1.06	-0.91	-1.00	0.17
	(0.81)	(0.89)	(0.95)	(0.65)	(0.91)	(0.82)	(0.89)	(0.75)
Constant	8.65**	11.13**	10.89*	15.81***	6.85	8.51**	8.99**	13.85***
	(4.30)	(5.01)	(5.75)	(4.19)	(4.22)	(3.85)	(4.41)	(3.85)
Control mean dep. var.	80.95	86.03	85.94	84.39	80.18	82.43	83.94	80.50
Survey controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	508	508	508	508	559	559	559	559

* p<0.10, ** p<0.05 *** p<0.01. OLS estimation of the treatment assignment on the change of perceptions regarding the team and the organization. Dependent variables are measures that range from 0-100, being 100 the highest level of agreement with the statements elicited. Columns (1) to (4) include the variables on perceptions of the team: *support, role model, recommend manager* and *innovative. Support* includes the statements *I have support for my career development, I receive ongoing coaching that helps me to constantly develop,* and *I feel supported when tackling obstacles that hinder my best work. Role Model* is measured through the question *My manager is a role model of our company values and behaviors. Recommend Manager* is measured through the question *I would recommend my manager to other associates in the firm. Innovative* is measured with the statements *I am encouraged to find new and better ways to do things,* and *I am encouraged to take informed risks in getting things done.* Columns (5) to (8) include the variables on perceptions about the organization: *Belonging, Engagement, Recommend Firm,* and *Trust*. *Belonging* is a measure of the statement *I feel a sense of belonging at my firm, Engagement* includes the questions *How happy are you working in the firm?*, and *The work that I do at the firm is meaningful to me. Recommend Firm* includes the question *I would recommend my company as a great place to work. Trust* includes the question *I trust colleagues across the firm. Control mean of dep. var reports the baseline mean of the control group. Survey controls* include baseline psychological safety, baseline trust and the baseline level of the dependent variable. *Demographic controls* include the ratio of women on the team, the time size and the team age dispersion.

Appendix:

Table A1: Balance of sample at baseline

	(1)	(2)	(3)	(4)	(5)
		Mean		*Differences with control group*	
Variable	Control	T1 (Needs)	T2 (Tasks)	T1 (Needs)	T2 (Tasks)
Demographics					
Ratio of female to male in the team (0-1)	0.59	0.57	0.59	0.00	-0.01
	(0.28)	(0.26)	(0.26)	(0.02)	(0.02)
Average total number of workers in the team	8.50	8.64	8.65	0.15	0.15
	(3.50)	(3.33)	(3.91)	(0.30)	(0.28)
Age gap between the oldest and youngest member of the team (in years)	19.44	19.65	19.57	0.12	0.21
	(8.09)	(8.21)	(7.73)	(0.65)	(0.67)
Response rates (in %)					
OV -Rate of respondents in the survey in the team	86.63	86.95	86.46	-0.17	0.32
	(14.62)	(14.12)	(14.94)	(1.29)	(1.26)
TP -Rate of respondents in the survey in the team	87.48	87.16	86.13	-1.35	-0.32
	(14.25)	(14.05)	(14.31)	(1.27)	(1.24)
Team-level metrics (0-100)					
Psychological Safety Index (Feedback, Inclusion)	82.86	83.54	83.46	0.61	0.68
	(11.72)	(11.25)	(11.63)	(1.04)	(1.01)
Support Index (Career, Coaching, Obstacles)	80.96	81.45	82.06	1.10	0.49
	(12.82)	(12.34)	(12.18)	(1.11)	(1.10)
Manager as a role model	86.03	86.96	87.70	1.66	0.92
	(13.12)	(11.79)	(11.92)	(1.12)	(1.10)
Recommend Manager	85.94	87.00	87.01	1.07	1.05
	(14.02)	(12.19)	(13.23)	(1.21)	(1.15)
Innovative Index (Experiment, Take Risks)	84.40	85.03	85.09	0.69	0.64
	(10.49)	(9.75)	(10.57)	(0.94)	(0.89)
Firm-level metrics (0-100)					
Psychological Safety (Speak up)	74.10	74.18	73.76	-0.34	0.08
	(12.73)	(12.96)	(13.38)	(1.14)	(1.12)
I feel a sense of belonging in the firm	80.19	80.39	80.01	-0.18	0.20
	(12.37)	(11.80)	(12.21)	(1.07)	(1.06)
Engage Index (Happy, Purpose)	82.25	82.62	82.00	-0.25	0.38
	(10.41)	(9.89)	(10.55)	(0.91)	(0.89)
I would recommend my firm as a great place to work	83.94	83.64	83.75	-0.19	-0.30
	(10.21)	(10.27)	(10.52)	(0.90)	(0.90)
I trust colleagues across my firm	80.50	80.81	79.48	-1.02	0.31
	(10.90)	(10.74)	(12.00)	(1.00)	(0.95)

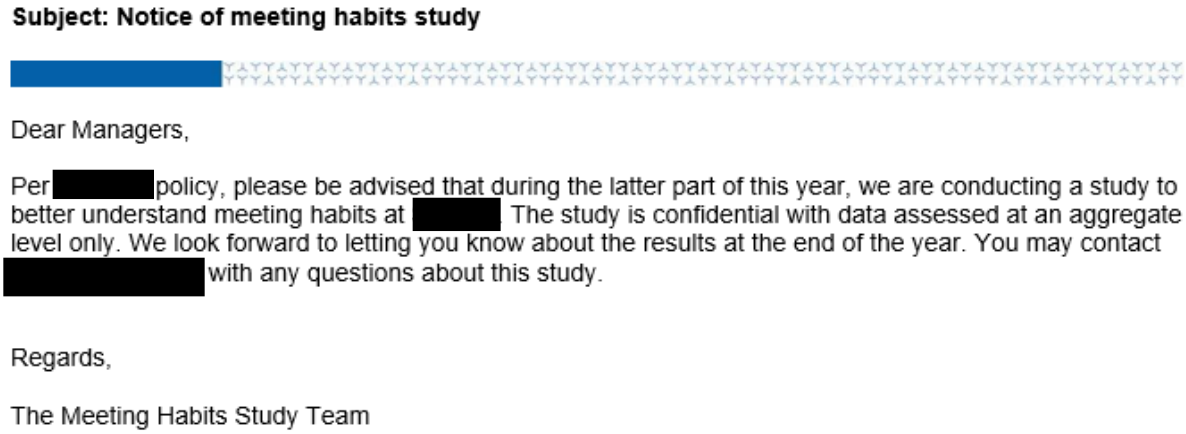
Means and standard deviations (in parenthesis) for teams' demographic characteristics, response rates, and baseline survey metrics. Columns (4) and (5) report the difference in the coefficients of a simple regression of the treatment on the variable with robust standard errors. * p<0.10, ** p<0.05 *** p<0.01.

Table A2: Team and Organizational Metrics

Variable	Question
Team Level Metrics	
Support	- I have support for my career development - I receive ongoing coaching that helps me to constantly develop - I feel supported when tackling obstacles that hinder my best work
Role Model	- My manager is a role model of our company values and behaviors
Recommend Manager	- I would recommend my manager to other associates in the firm
Innovative	- I am encouraged to find new and better ways to do things - I am encouraged to take informed risks in getting things done
Organizational Level Metrics	
Belonging	- I feel a sense of belonging at my firm
Engagement	- How happy are you working in the firm? - The work that I do at the firm is meaningful to me
Recommend Firm	- I would recommend my company as a great place to work
Trust	- I trust colleagues across the firm

The variables under *Team Level Metrics* belong to the survey that elicits team-level perceptions. The variables under *Organizational Level Metrics* include variables that are elicited to measure employee perceptions of the organization. All questions can be answered on a scale from 0-100.

Figure 1A: Launch email control group



Subject: Notice of meeting habits study

Dear Managers,

Per [redacted] policy, please be advised that during the latter part of this year, we are conducting a study to better understand meeting habits at [redacted]. The study is confidential with data assessed at an aggregate level only. We look forward to letting you know about the results at the end of the year. You may contact [redacted] with any questions about this study.

Regards,

The Meeting Habits Study Team

Figure 2A: Invitation email treatment groups

Subject: You're personally invited!

[redacted]

Psychological safety? Yes, please!

We would like to ask your support in a joint study to explore the effectiveness of 1:1 conversations with your team members. As we continue to progress in creating psychological safety, our aim is to develop a deeper understanding of how our conversations can impact team dynamics, performance, and well-being. **The study will be conducted between September 13-November 5, 2021.**

1:1 conversations help create the safe space all of us need to dig deeper into understanding what drives and inspires us to perform at our best and create impact that moves the business forward. Each 1:1 conversation is an opportunity to ensure a psychologically safe space for associates to collaborate effectively, be bold in sharing big ideas as well as perceived barriers, and provide the tools needed to enhance performance, well-being, and curiosity.

During this study, you will receive emails from Global Communications ([redacted] with guidance on how to participate and all the support you need. Your involvement will be seamless and easy, we promise! As we're sure you already conduct 1:1 meetings with your team members, incorporating the new tools and techniques into your schedule will be a light lift. Please review these emails carefully and contact [redacted] with any questions about this study.

Psychological safety is a prerequisite for our continued growth. Your invaluable feedback will therefore help inform our progress whilst also providing you with new insights that will drive success within your teams.

You may opt out of this study by clicking **here** to send an email saying 'opt out.'

Regards,

[redacted]
Sponsors of our Psychological Safety Priority

[redacted] [redacted] [redacted]
Head, Global P&O Chief Communications Officer Head, Ethics, Risk, & Compliance

Figure 3A: Launch email treatment groups

Subject line: 😎 Welcome to the psychological safety study at Sandoz!

Thank you for joining our study on psychological safety! Our aim is to develop a deeper understanding of how the quality and frequency of 1:1 conversations impact team dynamics.

During the next eight weeks (Sep 13 – Nov 5), we ask you to set up recurring weekly 1:1s with your team members as your schedule allows. Most managers already practice this approach, so this will be an easy way to get started. The ***attached instructions*** will guide you in how to reimagine your 1:1s so you can have more successful conversations and outcomes. Topics for discussion will also be suggested.

Be sure to use this opportunity to reset how you engage with your teams. Think about how you will actively listen, ask questions, allow the space for organic conversations to happen, and how you will offer support to your team members. Then, consider how you will gauge impact and collaboration within the context of how we go for growth as an organization.

Your continuous participation throughout the entire study is critical to informing our progress on psychological safety as it is a prerequisite for our continued growth. With a little mindfulness, we can seamlessly gather the information we are seeking to explore to ensure [redacted] associates have the tools and space they need be their best at work and at home. We look forward to working with you, and hope you gain insights that will drive success within your teams.

-Your Psychological Safety Study Team

Figure 4A: Meeting guidance for the treatment *needs*.

THE 1:1 STUDY

Use your 1:1 time to discover and adapt to the individual needs of your team.

Over the next six weeks we want you make space in your 1:1 meetings to focus away from day to day work and towards what matters most to your team members in the long-term, so they feel like unique individuals within the larger organization. Understanding their individual needs and perspectives will open up untapped potential.

We are all unique individuals with unique aspirations. Encouraging your team members to bring more of who they are to work will help develop better team dynamics. Here, we recommend some behaviours to role-model to provide the most valuable support. Follow the below approach:



Invite Insight

Ask your team members to come to your next 1:1 meeting with a topic that is meaningful to them. This could be anything from maintaining work-life balance to career aspirations to relationships within the team. Plan to work on it together over the six week period.



Be Empathetic

Give your team member time to talk about their chosen topic, and make sure you are an active, empathetic listener. Use it as an opportunity to really get to know their drivers, concerns and long-term hopes.



Ask Questions

Continue to let your team member lead the conversation and ask questions in return. They may dedicate their check-in to one topic or combine topics. What's important is that they feel they 'own' the chat and can use it for their benefit, development and well-being.

[redacted]

Figure 5A: Meeting guidance for the treatment *tasks*.

THE 1:1 STUDY

Use your 1:1 time to remove barriers & distractions from people making their most valuable contribution.

Over the next six weeks, we want you to focus your 1:1 time on making your team's lives simpler. This means exploring what is getting in the way of their best work, whether competing goals, unnecessary or deprioritised projects or process, systems or technology issues. Be sure to concentrate on the things within your and your colleagues control.

Removing barriers, distractions and time-sapping tasks is often the best way to unlock potential. Explore what your colleagues feel is getting in the way of their best work, and offer your support and guidance in clearing that path.

Using the Urgency/Importance Matrix to discuss tasks with your team members can help them reach their highest potential. Focus on what isn't important but is taking up unnecessary time and energy, and work together to reduce that friction.

	URGENT	NOT URGENT
IMPORTANT	QUADRANT 1 **REDUCE** Dealing with crisis management. Encourage your team member to spend less time here, and focus on Quadrant 2.	QUADRANT 2 **SCHEDULE** Spending time on strategically important tasks. Discuss the blockers that could prevent time spent on these tasks.
NOT IMPORTANT	QUADRANT 3 **DELEGATE** Enable independent decision making. Empower your team member by assigning tasks in this quadrant.	QUADRANT 4 **DECLUTTER** Help your team member eliminate tasks that do not align with their goals. Allow them to say no to these.

Based on feedback from [redacted] teams, goal conflicts can often be a barrier to completing projects and tasks with the best possible effort.

During your 1:1 sessions, make sure you focus on asking questions that help your team members open up. Ask about their needs and how you can help so that they can bring their best selves to their most important goals.

[redacted]