

**Electronic Supplementary Material for
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Additional Analyses

Results of ANCOVA

The interaction between the work attitude index and its baseline measurement (at 2016) was significant, indicating there were significant differences of the outcome at baseline, which is analog to the results of the ANOVA analyses. The three-way interaction of work attitude index, its baseline measurement, and group belonging of OUs was not significant (see Table E1).

Table E1

ANCOVA results comparing four groups of organizational units (OUs) on work attitude index

Test Description	Time point	dfNum	dfDem	F	p	η^2
Levene Test	2016	3.00	3087.00	0.67	.573	
	2017	3.00	3087.00	0.25	.864	
Work attitude index x Groups		3.00	3083.00	0.60	.568	.001
Work attitude index x Baseline		1.00	3083.00	11.64	.001	.004
Work attitude index x Baseline x Group		3.00	3083.00	0.90	.439	.001

Note: Group 1: OUs without action plans; Group 2: OUs with action plans in 2016; Group 3: OUs with action plans in 2017; Group 4: OUs with action plans in both years; work attitude index: overall mean rating of 22 employee survey items; baseline: work attitude index 2016.

Additional ANOVAs

Statistical Analyses

We conducted an additional 4 x 3 split-plot ANOVA for each factor of the survey as suggested by the EFA (Factor I: Work processes; Factor II: Interpersonal relations; Factor III: Personal well-being; Factor IV: Organizational topics) as an outcome. For each factor, OUs

were coded into four groups; Group 1: No action plans logged for according factor in either year, Group 2: Action plans logged in 2016 for according factor, Group 3: Action plans logged in 2017 for according factor, and Group 4: Action plans logged for according factor in both years. We examined the interaction between time and the different groups of OUs, with the aggregated mean responses of all items belonging to a respective factor as the respective outcome with three measurement time points (2016, 2017, & 2018).

Results

Please see Table E2 for means and standard deviations of each factor.

Factor I. We found a significant interaction effect for Factor I over time and groups (see Table E3). We examined the within-group differences with post hoc comparisons (see Table E4). They showed that OUs without action plans increased significantly from 2017 to 2018 on Factor I. OUs with action plans in 2016 increased significantly on the outcome from 2016 to 2017 and overall from 2016 to 2018. OUs with action plans in 2017 decreased significantly on the outcome from 2016 to 2017, but then increased significantly from 2017 to 2018. Lastly, OUs with action plans in both years increased significantly on the outcome from 2017 to 2018 and overall from 2016 to 2018.

The between-group differences showed that in 2016, OUs without any action plans had a significantly higher value on the outcome than OUs with action plans in 2016 and OUs with action plans in both years (see Table E5). OUs with action plans in 2017 had a significantly higher value on the outcome than OUs with action plans in 2016. There were no other significant differences between groups in 2017 or 2018.

Factor II. We found a significant interaction effect for Factor II over time and groups (see Table E3). The within-group comparison showed that OUs without any action plans significantly increased on Factor II from 2017 to 2018 and overall from 2016 to 2018 (see

Table E6). OUs with action plans in 2016 increased significantly on Factor II from 2016 to 2017 and overall from 2016 to 2018. OUs with action plans in 2017 increased significantly on the outcome from 2017 to 2018 and overall from 2016 to 2018. Lastly, OUs with action plans in both years increased significantly from 2017 to 2018 and overall from 2016 to 2018.

The between-group differences showed that in 2016, OUs without any action plans had a significantly higher rating on Factor II than OUs with action plans in both years and OUs with action plans in 2016 (see Table E7). OUs with action plans in 2017 also had a higher rating on the outcome than OUs with action plans in 2016. In 2017, OUs without any action plans had a significantly higher rating on the outcome than OUs with action plans in 2017 and than OUs with action plans in both years. Also, OUs with action plans in 2016 had significantly higher ratings than OUs with action plans in 2017 and than OUs with action plans in both years. In 2018, there were no significant differences between groups.

Factor III. We found a significant interaction effect for Factor III over time and groups (see Table E3). The within-group comparison showed that OUs without any action plans decreased significantly on Factor III from 2016 to 2017. They increased slightly, but significantly from 2017 to 2018, but overall showed a significant decrease from 2016 to 2018. OUs with action plans in 2016 increased significantly on the outcome from 2016 to 2017 and overall from 2016 to 2018. OUs with action plans in 2017 decreased significantly on the outcome from 2016 to 2017, then increased significantly from 2017 to 2018. Lastly, OUs with action plans in both years increased significantly from 2016 to 2018 on the outcome.

The between-group differences showed that in 2016, OUs without action plans and OUs with action plans in 2017 both had a significantly higher rating on Factor III than OUs with action plans in both years and than OUs with action plans in 2016. In 2017, OUs without

action plans had a significantly higher rating on the outcome than OUs with action plans in 2017. Lastly, in 2018, there were no significant differences between groups.

Factor IV. The interaction effect between Factor III over time and groups was not significant (see Table E3).

Discussion

Overall, the data show similar patterns as with the ANOVA and work attitude index as the outcome, but they are surrounded by some ambiguity and are less clear. For Factor I, the groups showed increases when action planning was done, but also the group without action planning on that factor showed a small, but significant increase. However, Factor I also included the item: “*Overall, in the last 12 months there have been sustainable positive improvements within our OU/team*”, and additional analyses showed that 120 OUs that did not conduct any action planning for Factor I, did develop action plans for the other factors in either 2016 or 2017, as the groups are not independent from each other. As this item asks about improvements in general, improvements resulting from action planning on other factors could have diluted the results for Factor I. For Factors II and III, OUs with action plans in both years showed the greatest improvement, but also started lowest at baseline and did not perform better than the other groups by 2018.

Lastly, action planning seemed to not be effective for Factor IV. None of the groups improved on this factor despite action planning. When considering the items associated with that factor (employer attractiveness, professional development opportunities, reputation of employer, and cooperation with subsidiary companies), action planning on the team level might be difficult to conduct and implement. Concrete activities to ameliorate issues for topics of such an overarching organizational nature are rather difficult to develop on a team

level. OUs might not have influence on these topics, and they might be more appropriately addressed with a top-down action planning approach.

Overall, the found effects were small (see Table E3), and these results should be viewed with caution as they are subject to the same limitations discussed in the main manuscript.

Table E2

Changes over time in four factors of survey for groups of organizational units (OUs)

Group	Time point	Factor I			Factor II			Factor III			Factor IV		
		M	SD	N	M	SD	N	M	SD	N	M	SD	N
OUs without action plans	T1	3.77	0.42	2175	3.93	0.44	2282	4.00	0.37	2713	3.90	0.35	2778
	T2	3.76	0.44		3.93	0.47		3.97	0.40		3.78	0.35	
	T3	3.78	0.44		3.97	0.47		3.98	0.40		3.73	0.35	
OUs with action plans in 2016	T1	3.71	0.39	456	3.81	0.43	387	3.87	0.36	188	3.89	0.34	118
	T2	3.77	0.42		3.92	0.45		3.93	0.36		3.81	0.31	
	T3	3.76	0.42		3.94	0.46		3.93	0.38		3.78	0.35	
OUs with action plans in 2017	T1	3.78	0.40	248	3.88	0.42	258	3.98	0.35	141	3.88	0.32	155
	T2	3.72	0.43		3.84	0.46		3.86	0.38		3.72	0.32	
	T3	3.77	0.47		3.94	0.49		3.95	0.39		3.74	0.34	
OUs with action plans both years	T1	3.71	0.35	211	3.80	0.41	163	3.85	0.35	49	3.83	0.30	40
	T2	3.74	0.40		3.83	0.43		3.94	0.32		3.79	0.29	
	T3	3.81	0.40		3.96	0.44		4.02	0.44		3.77	0.40	
All OUs*	T1	3.76	0.41	3090	3.91	0.44	3090	3.98	0.37	3091	3.90	0.34	3091
	T2	3.75	0.44		3.92	0.46		3.96	0.40		3.78	0.35	
	T3	3.78	0.44		3.96	0.47		3.98	0.40		3.73	0.35	

Note: T1: 2016; T2: 2017; T3: 2018. Factor I: Work processes; Factor II: Interpersonal relations; Factor III: Personal well-being; Factor IV: Organizational topics.

Items were rated on a 5-point Likert scale with percent anchors (0 = strongly disagree; 25 = slightly disagree; 50 = neither agree, nor disagree; 75 = slightly agree; 100 = strongly agree) which were recoded to reflect a 1 – 5 Likert scale.

*Differences in total N between factors is due to one OU collectively not responding to an item belonging to that factor, hence leading to listwise deletion.

Table E3

ANOVA results comparing four groups of organizational units (OUs) on four factors of survey

Test Description	Time point	dfNum	dfDem	F	p	ηp^2
Levene Test	2016	3.00	3086.00	3.54	.014	
	2017	3.00	3086.00	0.99	.396	
	2018	3.00	3086.00	1.86	.135	
Factor I x Groups		5.73	2.06	4.66	<.001	.005
Levene Test	2016	3.00	3086.00	0.57	.638	
	2017	3.00	3086.00	0.62	.601	
	2018	3.00	3086.00	0.30	.829	
Factor II x Groups		5.65	4.07	8.79	<.001	.008
Levene Test	2016	3.00	3087.00	0.52	.666	
	2017	3.00	3087.00	1.52	.207	
	2018	3.00	3087.00	0.59	.623	
Factor III x Groups		5.84	2.13	5.79	<.001	.006
Levene Test	2016	3.00	3087.00	1.15	.326	
	2017	3.00	3087.00	2.79	.039	
	2018	3.00	3087.00	1.14	.333	
Factor IV x Groups		5.70	0.73	2.02	.063	.002

Note: Huynh-Feldt adjusted results are reported due to violation of Mauchly Tests of Sphericity for

Factor 1: $\chi^2(2) = 151.45$, $p < .001$; Factor 2: $\chi^2(2) = 200.69$, $p < .001$; Factor 3: $\chi^2(2) = 91.81$, $p < .001$;

Factor 4: $\chi^2(2) = 173.18$, $p < .001$.

Factor I: Work processes; Factor II: Interpersonal relations; Factor III: Personal well-being;

Factor IV: Organizational topics.

Group 1: OUs without action plans; Group 2: OUs with action plans in 2016; Group 3: OUs with action plans in 2017; Group 4: OUs with action plans in both years.

Table E4

Mean differences between time points in Factor I across organizational unit (OU) groups

	OUs without APs				OUs with APs in 2016			
	2016	95% CI	2017	95% CI	2016	95% CI	2017	95% CI
2017	-0.01	[-0.03, 0.00]			0.06*	[0.02, 0.09]		
2018	0.01	[-0.01, 0.03]	0.02*	[0.01, 0.04]	0.05*	[0.01, 0.09]	0.00	[-0.04, 0.03]

	OUs with APs in 2017				OUs with APs in both years			
	2016	95% CI	2017	95% CI	2016	95% CI	2017	95% CI
2017	-0.06*	[-0.10, -0.01]			0.04	[-0.02, 0.09]		
2018	-0.01	[-0.06, 0.04]	0.05*	[0.00, 0.09]	0.10*	[0.05, 0.16]	0.07*	[0.02, 0.11]

Note: Posthoc comparisons using Fisher's least significance difference (LSD). Mean differences shown.

APs: action plans

*indicates the mean difference is significant at the 0.05 level.

Table E5

Between group mean differences between organizational unit (OU) groups on Factor I for survey years 2016, 2017, & 2018

		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2016	OUs with APs in 2016	0.00	[-0.07, 0.07]				
	OUs with APs in 2017	0.07	[-0.01, 0.14]	0.07*	[0.00, 0.13]		
	OUs without APs	0.06*	[0.00, 0.12]	0.06*	[0.02, 0.10]	-0.01	[-0.06, 0.05]
		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2017	OUs with APs in 2016	0.02	[-0.05, 0.09]				
	OUs with APs in 2017	-0.03	[-0.11, 0.05]	-0.05	[-0.11, 0.02]		
	OUs without APs	0.01	[-0.05, 0.07]	-0.01	[-0.05, 0.04]	0.04	[-0.02, 0.10]
		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2018	OUs with APs in 2016	-0.05	[-0.12, 0.02]				
	OUs with APs in 2017	-0.05	[-0.13, 0.03]	0.00	[-0.06, 0.07]		
	OUs without APs	-0.03	[-0.09, 0.03]	0.02	[-0.03, 0.06]	0.01	[-0.04, 0.07]

Note: Posthoc comparisons using Fisher's least significance difference (LSD). Mean differences shown.

APs: action plans

*indicates the mean difference is significant at the 0.05 level.

Table E6

Mean differences between time points in Factor II across organizational unit (OU) groups

	OUs without APs				OUs with APs in 2016			
	2016	95% CI	2017	95% CI	2016	95% CI	2017	95% CI
2017	0.00	[-0.01, 0.02]			0.11*	[0.08, 0.15]		
2018	0.04*	[0.02, 0.05]	0.04*	[0.02, 0.05]	0.13*	[0.09, 0.17]	0.02	[-0.02, 0.05]

	OUs with APs in 2017				OUs with APs in both years			
	2016	95% CI	2017	95% CI	2016	95% CI	2017	95% CI
2017	-0.04	[-0.09, 0.01]			0.03	[-0.03, 0.09]		
2018	0.06*	[0.01, 0.11]	0.10*	[0.06, 0.14]	0.16*	[0.09, 0.22]	0.13*	[0.07, 0.18]

Note: Posthoc comparisons using Fisher's least significance difference (LSD). Mean differences shown.

APs: action plans

*indicates the mean difference is significant at the 0.05 level.

Table E7

Between group mean differences between organizational unit (OU) groups on Factor II for survey years 2016, 2017, & 2018

		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2016	OUs with APs in 2016	0.01	[-0.08, 0.09]				
	OUs with APs in 2017	0.08	[-0.01, 0.17]	0.08*	[0.01, 0.14]		
	OUs without APs	0.13*	[0.06, 0.20]	0.13*	[0.08, 0.17]	0.05	[-0.01, 0.11]
		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2017	OUs with APs in 2016	0.09*	[0.01, 0.18]				
	OUs with APs in 2017	0.01	[-0.08, 0.10]	-0.08*	[-0.16, -0.01]		
	OUs without APs	0.10*	[0.03, 0.18]	0.01	[-0.04, 0.06]	0.09*	[0.04, 0.15]
		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2018	OUs with APs in 2016	-0.02	[-0.11, 0.07]				
	OUs with APs in 2017	-0.02	[-0.11, 0.07]	0.00	[-0.07, 0.08]		
	OUs without APs	0.01	[-0.06, 0.09]	0.03	[-0.02, 0.08]	0.03	[-0.03, 0.09]

Note: Posthoc comparisons using Fisher's least significance difference (LSD). Mean differences shown.

APs: action plans

*indicates the mean difference is significant at the 0.05 level.

Table E8

Mean differences between time points in Factor III across organizational unit (OU) groups

	OUs without APs				OUs with APs in 2016			
	2016	95% CI	2017	95% CI	2016	95% CI	2017	95% CI
2017	-0.03*	[-0.04, -0.02]			0.05*	[0.01, 0.10]		
2018	-0.02*	[-0.03, 0.00]	0.01*	[0.00, 0.02]	0.06*	[0.00, 0.11]	0.00	[-0.05, 0.05]

	OUs with APs in 2017				OUs with APs in both years			
	2016	95% CI	2017	95% CI	2016	95% CI	2017	95% CI
2017	-0.11*	[-0.17, -0.05]			0.09	[-0.01, 0.19]		
2018	-0.02	[-0.09, 0.04]	0.09*	[0.03, 0.14]	0.17*	[0.07, 0.28]	0.08	[-0.01, 0.17]

Note: Posthoc comparisons using Fisher's least significance difference (LSD). Mean differences shown.

APs: action plans

*indicates the mean difference is significant at the 0.05 level.

Table E9

Between group mean differences between organizational unit (OU) groups on Factor II for survey years 2016, 2017, & 2018

		APs in both years	95% CI	APs in 2016	95% CI	APs in 2017	95% CI
2016	OUs with APs in 2016	0.02	[-0.10, 0.13]				
	OUs with APs in 2017	0.12*	[0.00, 0.24]	0.10*	[0.02, 0.18]		
	OUs without APs	0.14*	[0.04, 0.25]	0.12*	[0.07, 0.18]	0.02	[-0.04, 0.08]
2017	OUs with APs in 2016	-0.02	[-0.14, 0.11]				
	OUs with APs in 2017	-0.08	[-0.21, 0.05]	-0.06	[-0.15, 0.03]		
	OUs without APs	0.02	[-0.09, 0.14]	0.04	[-0.02, 0.10]	0.10*	[0.04, 0.17]
2018	OUs with APs in 2016	-0.10	[-0.22, 0.03]				
	OUs with APs in 2017	-0.07	[-0.20, 0.06]	0.02	[-0.06, 0.11]		
	OUs without APs	-0.04	[-0.16, 0.07]	0.05	[-0.01, 0.11]	0.03	[-0.04, 0.10]

Note: Posthoc comparisons using Fisher's least significance difference (LSD). Mean differences shown.

APs: action plans

*indicates the mean difference is significant at the 0.05 level.