

<b>Reference #</b>
09-1009 NCI

# The Denison Leadership Development Survey: Exploring Gender Differences at the National Institutes of Health

Submitted to: Mary Burness and Teresa Estrada, National Cancer Institute

Submitted by: Lindsey Kotrba, Ashley Guidroz & Nathalie Castaño, Denison Consulting

March, 2011



## Executive Summary

The purpose of this study was to explore potential differences between male and female scientific leaders at the National Institutes of Health (NIH). The specific questions addressed in this study were 1) do differences exist in the perceived leadership skills of female and male scientific leaders; 2) if so, in what leadership skills are these differences found; and 3) what additional leadership skills among all scientists, if enhanced, could result in improved organizational performance?

Participants were invited to complete the Denison Leadership Development 360 survey (DLDS). Eleven male and eleven female scientists were matched on academic degree, age, tenure as an independent investigator, tenure at NIH, job title, and scientific field. Male and female leaders were compared on how they rated their own leadership competencies and how they were rated by their Peers, Direct Reports, Supervisors, and Others.

Results indicate small differences in Self, and Peer, and Other ratings for male and female leaders, but these differences were not consistently in favor of males or females nor were they statistically significant. Larger differences were observed in Direct Report ratings and Supervisor ratings. Specifically, Direct Reports rated male leaders significantly higher ( $p < .05$ ) on indexes that measure aspects of internal behavior, such as Develops Organizational Capability and Works to Reach Agreement. Supervisors rated male leaders marginally higher than female leaders on Promotes Organizational Learning and Creates Shared Vision which are external indexes of the Denison Leadership Model.

A sample size of eleven matched pairs is very small and limits the power to detect meaningful differences. However, these results suggest that male and female leaders may be perceived differently by their Peers, Direct Reports, and Supervisors at the National Institutes of Health. More research with a larger, more representative sample is needed.

## Background

The purpose of this study was to explore potential differences between male and female scientific leaders at NIH with regard to their perceived leadership competencies and to identify leadership strengths and weaknesses among all scientists in this cohort. The specific questions this investigation seeks to address are: Do differences exist in the perceived leadership skills of female and male scientific leaders? If so, in what leadership skills are these differences found? What additional leadership skills among all scientists, if enhanced, could result in improved organizational performance? The ultimate goal for the National Cancer Institute (NCI), which conducted this study, is to be able to use this information to make recommendations for enhanced leadership development programs that focus on the development needs of their scientific leaders.

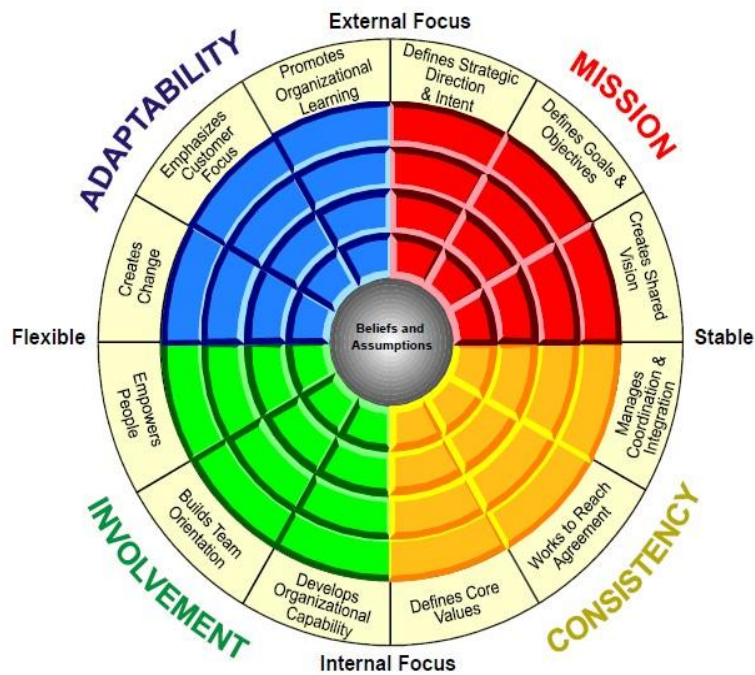
## Study Design

Twenty-two leaders volunteered to take the Denison Leadership Development Survey (DLDS) as part of this study. Participating leaders also received one-on-one coaching to review their survey results and create development plans. Male and female leaders were matched by NCI on several criteria (i.e., academic degree, age, tenure as an independent investigator, tenure at NIH, job title, and scientific field) yielding 11 comparison pairs. Leaders were compared on how they rated their own leadership competencies and how they were rated by their Peers, Direct Reports, Supervisors, and Other raters. Leaders were rated by an average of 3.58 Peers, 3.59 Direct Reports, 1.33 Supervisors, and 3.03 Other raters. It should be noted that a much larger sample was planned. Despite several separate recruitment efforts, the enrollment rate was substantially lower than the researchers expected. Additionally, 41% of those who enrolled in the study never completed it (52% of females, 35% of males).

The competencies rated were derived from the organizational effectiveness literature (e.g. Denison, 1990) and include: Empowering People, Building Teamwork, Developing Organizational Capability, Defining Core Values, Working to Reach Agreement, Managing Coordination and Integration, Creating Change, Promoting Organizational Learning, Emphasizing Customer Focus, Creating Shared Vision, Defining Strategic Direction and Intent, and Defining Goals and Objectives (See Figure 1).

Bringing Organizational Culture and Leadership to the **Bottom Line**.

Figure 1. Denison Leadership Development Model



## Analyses

A series of paired-samples t-tests were conducted to compare men and women on perceptions of leadership competency measured by the DLDS. It is important to note that the sample for this study was very small, which limits the power needed to detect meaningful differences.

## Self Perceptions

Figure 2 compares Self ratings of male and female leaders on the 12 indexes of the DLDS. The differences observed indicate that males scored slightly higher on the internal leadership traits, while female leaders rated themselves similarly across all indexes. Females tend to rate themselves slightly higher on Defines Strategic Direction and Intent, Defines Goals & Objectives, Creates Shared Vision, and Emphasizes Customer Focus whereas males rate themselves higher on Empowers People and Develops Organizational Capability. None of these differences were found to be statistically significant.

Figure 2: Self Ratings of Male and Female Leaders

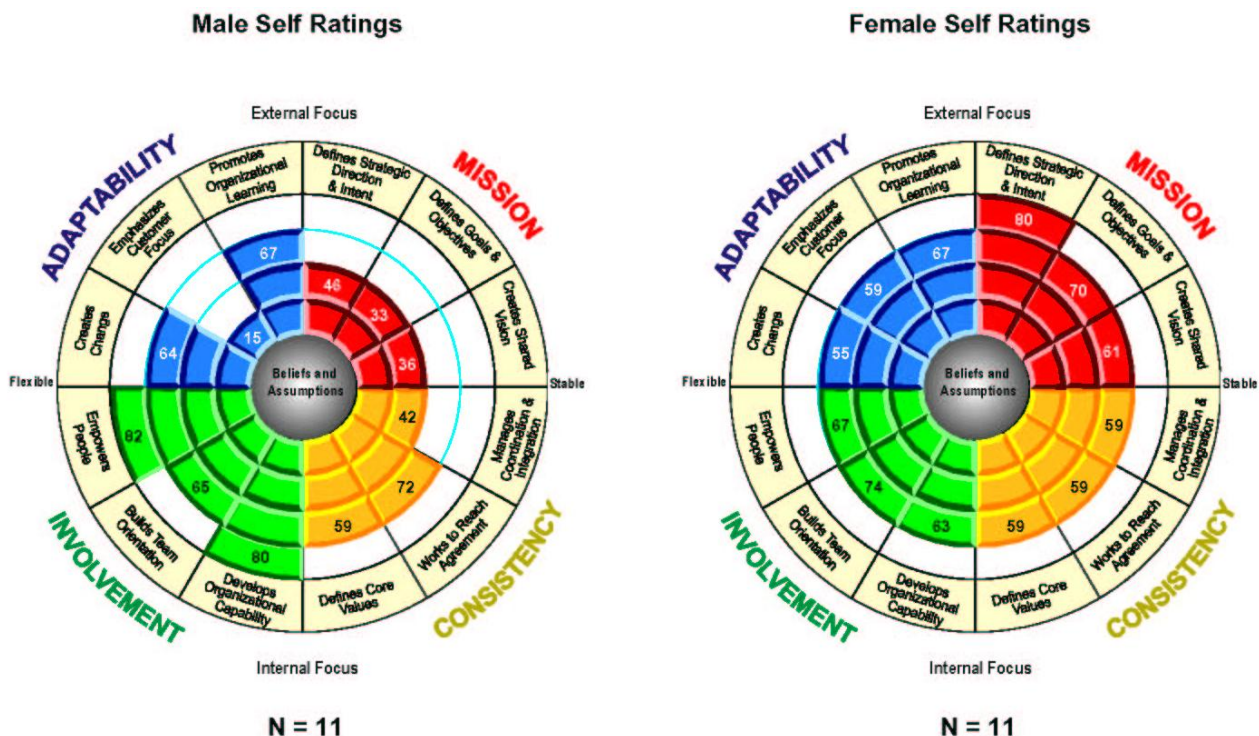


Table 1 displays the average Self rating of male leaders, the average Self rating of female leaders, the difference between these ratings, t-value – which is the result of a paired-sample t-test, significance – which indicates whether the t-test detected significant differences, and the effect size – which is an index of whether or not a significant difference can be considered meaningful. Typically, when Cohen's *d* is less than or equal to .20, the effect (difference) is considered trivial, a *d* value of .50 indicates a medium effect that is worth taking note of, and a *d* value of .80 is considered to be a strong effect (i.e., meaningful difference). Our analyses indicate that the differences between male and female leaders' Self ratings are not significant.

Table 1: Self Ratings of Female and Male Leaders

Index	Males	Females	Mean Differences	T-value	Sig.	Cohen's d
Empowers People	6.38	6.17	0.20	0.84	--	0.36
Builds Team Orientation	6.23	6.33	-0.10	-0.44	--	0.19
Develops Organizational Capability	6.16	5.95	0.21	1.03	--	0.44
Defines Core Values	6.16	6.17	-0.01	-0.04	--	0.02
Works to Reach Agreement	6.06	5.95	0.10	0.33	--	0.14
Manages Coordination & Integration	5.70	5.86	-0.15	-0.35	--	0.15
Creates Change	5.95	5.94	0.01	0.04	--	0.02
Emphasizes Customer Focus	5.41	6.01	-0.61	-0.71	--	0.30
Promotes Organizational Learning	5.96	5.90	0.06	0.21	--	0.09
Defines Strategic Direction & Intent	5.70	6.13	-0.43	-1.32	--	0.56
Defines Goals and Objectives	5.52	6.05	-0.53	-1.38	--	0.59
Creates Shared Vision	5.36	5.75	-0.39	-0.67	--	0.29

Note: Cohen's *d* = .20 – small effect, *d* = .50 – medium effect, *d* = .80 – large effect



Bringing Organizational Culture and Leadership to the **Bottom Line**.

## Peer Perceptions

Figure 3 and Table 2 include the Peer ratings of male and female leaders on the 12 indexes of the DLDS. Similar to Self ratings, there are only small differences between males and females (i.e. Peer ratings are similar for both genders). There were no significant differences across any of the 12 indexes between Peer ratings of male and female leaders.

Figure 3: Peer Ratings of Male and Female Leaders

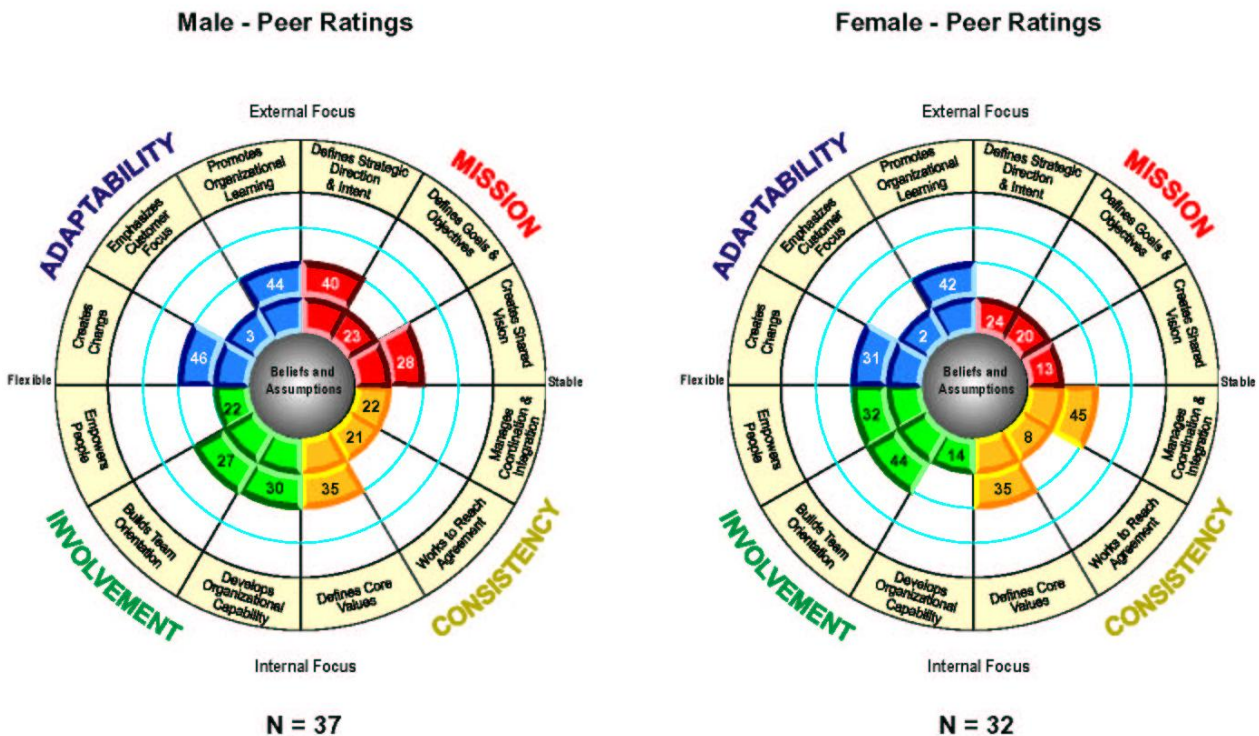


Table 2: Peer Ratings of Female and Male Leaders

Index	Males	Females	Mean Differences	T-value	Sig.	Cohen's d
Empowers People	5.26	5.45	-0.18	-0.70	--	0.30
Builds Team Orientation	5.55	5.73	-0.18	-0.35	--	0.15
Develops Organizational Capability	5.21	4.72	0.49	1.06	--	0.45
Defines Core Values	5.66	5.74	-0.08	-0.25	--	0.10
Works to Reach Agreement	5.05	4.58	0.47	1.12	--	0.48
Manages Coordination & Integration	5.19	5.65	-0.45	-1.15	--	0.49
Creates Change	5.56	5.28	0.29	0.62	--	0.26
Emphasizes Customer Focus	4.16	3.96	0.20	0.25	--	0.11
Promotes Organizational Learning	5.56	5.50	0.06	0.14	--	0.06
Defines Strategic Direction & Intent	5.51	5.23	0.29	0.51	--	0.22
Defines Goals and Objectives	5.30	5.19	0.10	0.23	--	0.10
Creates Shared Vision	5.15	4.58	0.57	1.15	--	0.49

Note: Cohen's d = .20 – small effect, d = .50 – medium effect, d = .80 – large effect



## Direct Report Perceptions

Figure 4 and Table 3 provide the Direct Report ratings of male and female leaders on the 12 indexes of the DLDS. Unlike Self and Peer ratings, there are significant differences between Direct Report ratings of male and female leaders for certain indexes. As shown in Figure 1, the profile for male leaders shows more color, which indicates that Direct Report ratings were higher for males than females. Although differences can be noted in the profiles across all indexes, as indicated in Table 4 males were only rated significantly higher on Develops Organizational Capability and Works to Reach Agreement based on  $p < .05$ ; male leaders were rated marginally higher on Empowers People and Promotes Organizational Learning based on  $p < .10$ . Thus, while we see big differences in percentiles between male and female leaders, significant differences at  $p < .05$  are only found for two indexes. Empowers People and Promotes Organizational Learning show marginal differences at  $p < .10$ , such that males are rated higher than females.

Figure 4: Direct Report Ratings of Male and Female Leaders

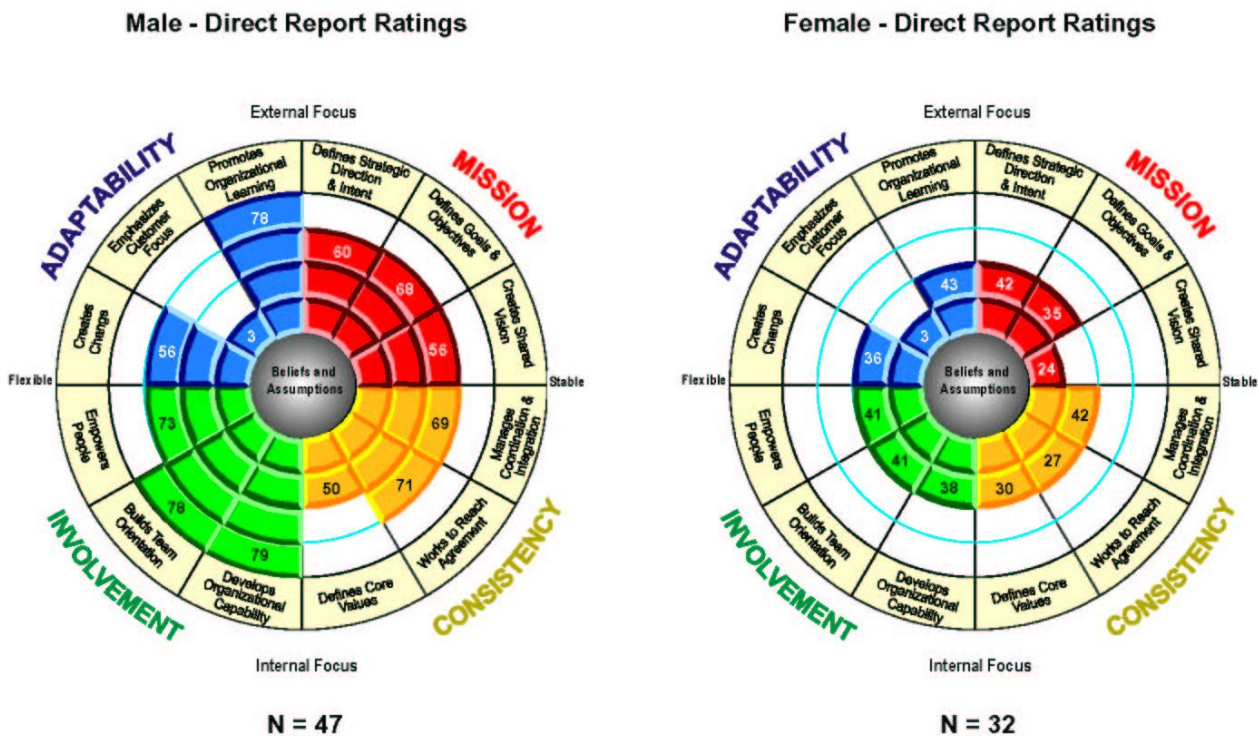


Table 3: Direct Report Ratings of Female and Male Leaders

Index	Males	Females	Mean Differences	T-value	Sig.	Cohen's d
Empowers People	6.22	5.72	0.49	1.96	*	0.84
Builds Team Orientation	6.32	5.75	0.57	1.80	--	0.77
Develops Organizational Capability	6.06	5.33	0.73	2.97	**	1.27
Defines Core Values	5.96	5.57	0.39	1.69	--	0.72
Works to Reach Agreement	6.04	5.31	0.73	3.67	**	1.57
Manages Coordination & Integration	6.07	5.67	0.40	1.62	--	0.69
Creates Change	5.86	5.51	0.35	1.51	--	0.65
Emphasizes Customer Focus	4.34	4.16	0.18	0.46	--	0.20
Promotes Organizational Learning	6.20	5.66	0.53	2.14	*	0.91
Defines Strategic Direction & Intent	5.88	5.59	0.29	0.74	--	0.32
Defines Goals and Objectives	6.07	5.56	0.51	1.71	--	0.73
Creates Shared Vision	5.63	4.88	0.74	1.63	--	0.70

Note: \*  $p < .10$ ; \*\*  $p < .05$ ; Cohen's  $d = .20$  – small effect,  $d = .50$  – medium effect,  $d = .80$  – large effect

## Supervisor Perceptions

Figure 5 and Table 4 compare the Supervisor ratings of male and female leaders on the 12 indexes of the DLDS. Not all Supervisors responded to the survey; thus, only 7 male/female pairs were considered in this analysis. As indicated by the leader profiles, Supervisors rated male leaders higher than female leaders in all indexes. Although differences can be noted in the profiles as indicated in Table 4, no significant differences were found at the  $p < .05$  level. Male leaders were rated marginally higher than female leaders by Supervisors on the indexes of Promotes Organizational Learning and Creates Shared Vision based on  $p < .10$ .

Figure 5: Supervisor Ratings of Male and Female Leaders

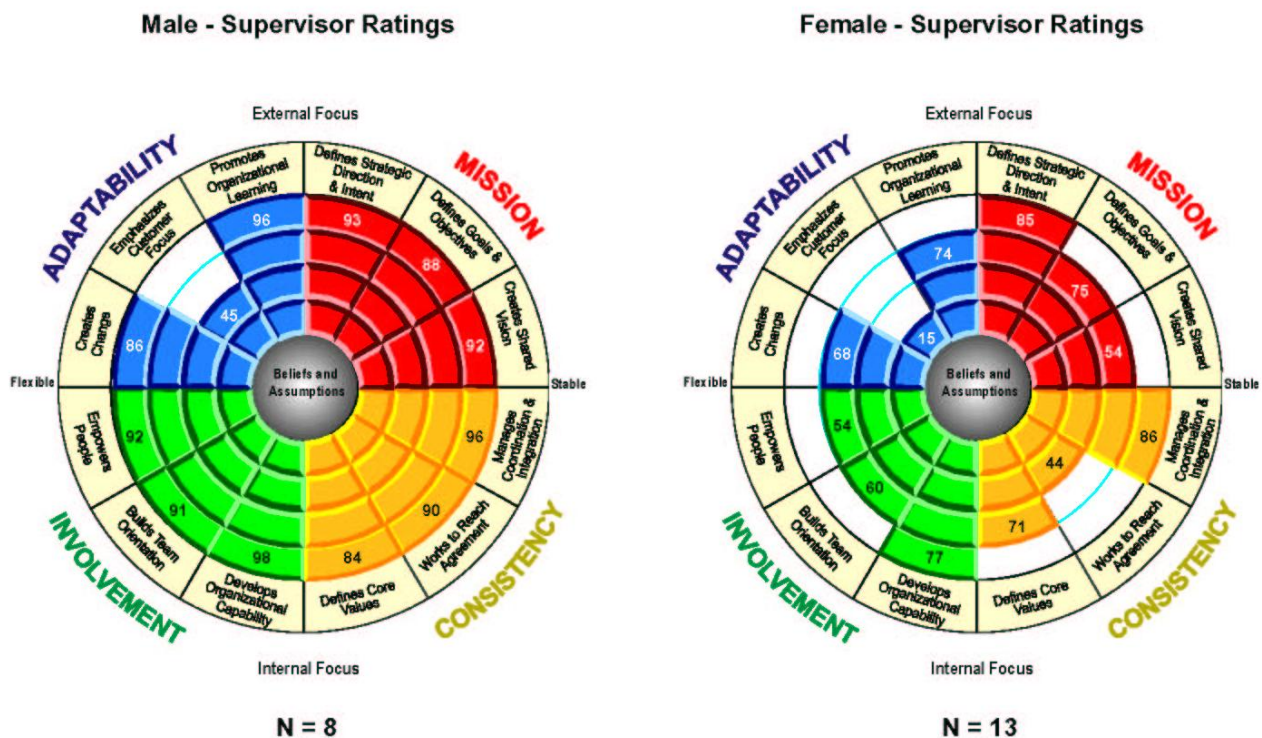


Table 4: Supervisor Ratings of Female and Male Leaders

Index	Males	Females	Mean Differences	T-value	Sig.	Cohen's d
Empowers People	6.72	5.89	0.82	1.76	--	0.75
Builds Team Orientation	6.76	6.15	0.62	1.17	--	0.50
Develops Organizational Capability	6.78	6.14	0.64	1.82	--	0.78
Defines Core Values	6.66	6.52	0.14	0.33	--	0.14
Works to Reach Agreement	6.52	5.89	0.64	1.50	--	0.64
Manages Coordination & Integration	6.78	6.47	0.30	0.87	--	0.37
Creates Change	6.44	5.98	0.46	1.16	--	0.49
Emphasizes Customer Focus	6.41	4.50	1.91	2.25	--	0.96
Promotes Organizational Learning	6.73	6.04	0.69	2.10	*	0.89
Defines Strategic Direction & Intent	6.56	6.28	0.28	0.84	--	0.36
Defines Goals and Objectives	6.77	6.17	0.60	1.73	--	0.74
Creates Shared Vision	6.78	5.73	1.05	2.24	*	0.96

Note: \*  $p < .10$ ; Cohen's  $d = .20$  – small effect,  $d = .50$  – medium effect,  $d = .80$  – large effect



## Others Perceptions

Figure 6 and Table 5 include ratings from other people who interact with the leaders on the 12 indexes of the DLDS. As shown in Figure 6, ratings for male and female leaders were similar. Although female leaders were rated higher than male leaders on 8 of the 12 indexes, statistical analyses showed no significant differences between Others ratings of male and female leaders.

Figure 6: Others Ratings of Male and Female Leaders

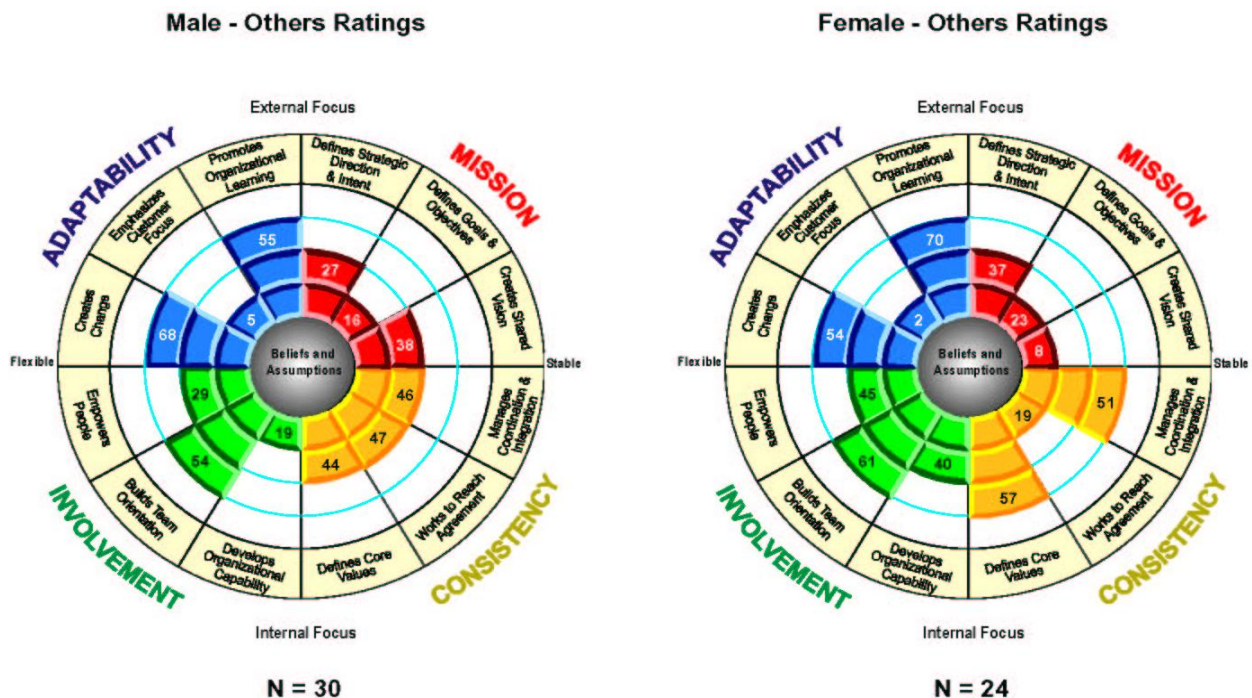




Table 5: Others Ratings of Female and Male Leaders

Index	Males	Females	Mean Differences	T-value	Sig.	Cohen's d
Empowers People	5.33	5.69	-0.36	-0.82	--	0.35
Builds Team Orientation	5.73	5.96	-0.22	-0.63	--	0.27
Develops Organizational Capability	4.84	5.38	-0.55	-1.14	--	0.48
Defines Core Values	5.73	6.02	-0.29	-0.73	--	0.31
Works to Reach Agreement	5.49	5.13	0.36	1.10	--	0.47
Manages Coordination & Integration	5.50	5.67	-0.17	-0.71	--	0.30
Creates Change	5.75	5.65	0.10	0.34	--	0.14
Emphasizes Customer Focus	4.59	4.58	0.01	0.02	--	0.01
Promotes Organizational Learning	5.58	5.85	-0.27	-1.04	--	0.44
Defines Strategic Direction & Intent	5.14	5.43	-0.29	-0.91	--	0.39
Defines Goals and Objectives	4.76	5.30	-0.54	-1.70	--	0.73
Creates Shared Vision	5.06	4.40	0.66	1.47	--	0.63

Note: Cohen's d = .20 – small effect, d = .50 – medium effect, d = .80 – large effect

## Combined Other

Figure 7 and Table 6 compare the Combined Other ratings of male and female leaders on the 12 indexes of the DLDS. For this Combined Other category, we averaged the scores of Peers, Direct Reports, Supervisors, and Others into a single rating. As shown by the profiles in Figure 5, male leaders were rated higher than female leaders in most indexes. However, as indicated in Table 6 significant differences were only found for one index: Works to Reach Agreement based on  $p < .05$ . Marginal differences were found for Promotes Organizational Learning based on  $p < .10$ .

Figure 7: Combined Other Ratings of Male and Female Leaders

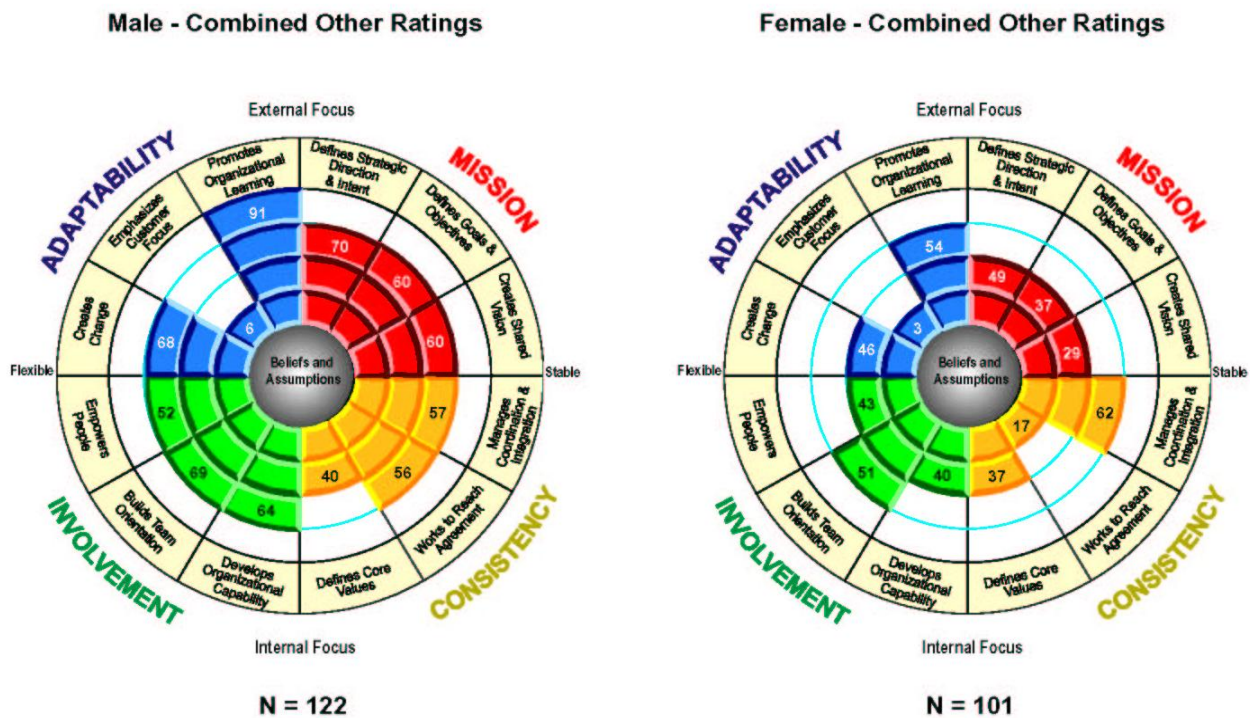


Table 6: Combined Other Ratings of Female and Male Leaders

Index	Males	Females	Mean Differences	T-value	Sig.	Cohen's d
Empowers People	5.81	5.71	0.10	0.57	--	0.24
Builds Team Orientation	6.05	5.85	0.21	0.67	--	0.29
Develops Organizational Capability	5.71	5.40	0.31	1.30	--	0.56
Defines Core Values	5.85	5.81	0.04	0.20	--	0.09
Works to Reach Agreement	5.74	5.16	0.59	3.99	**	1.70
Manages Coordination & Integration	5.83	5.88	-0.05	-0.26	--	0.11
Creates Change	5.90	5.61	0.28	1.63	--	0.69
Emphasizes Customer Focus	5.01	4.71	0.30	0.96	--	0.41
Promotes Organizational Learning	6.03	5.71	0.32	2.22	*	0.95
Defines Strategic Direction & Intent	5.90	5.67	0.24	0.79	--	0.34
Defines Goals and Objectives	5.87	5.61	0.25	1.32	--	0.56
Creates Shared Vision	5.62	5.16	0.45	1.57	--	0.67

Note: \*  $p < .10$ ; \*\*  $p < .05$ ; Cohen's  $d = .20$  – small effect,  $d = .50$  – medium effect,  $d = .80$  – large effect

## Summary

In general, although small differences were found for some rater groups, significant differences ( $p < .05$ ) were only found for Direct Report and Combined Other perceptions of the leadership competencies of male and female leaders. An important limitation to note is the small amount of data available to conduct these analyses. Thus, these patterns could change if more data were available. Additionally, given the significant dropout rate and the fact that participants volunteered rather than being chosen at random, serious concerns about the representativeness of the sample have to be considered.

No significant differences were observed at  $p < .05$  between male and female leaders by the Self, Peer, Supervisor, or Other raters. Direct Reports of males rated their leaders more favorably than those of females. Combined Other ratings mirrored some of the patterns observed in the Direct Report ratings. Some marginal differences were found for Direct Reports, Supervisors, and Combined Others. Table 7 provides a summary of the significant differences between male and female leaders by rater group, as well as the marginal differences.

In conclusion, this research suggests that there may be some differences in how male and female leaders are perceived at NIH, especially by their Direct Reports. Potentially, more gender differences could be found in other indexes, but due to the small sample size, this cannot be determined. A larger, more representative dataset is needed to provide greater certainty regarding these results.

Table 7: A Summary of the Significant Differences between Males and Females by Rater group

Index	Self	Peer	Direct Report	Supervisor	Others	Combined Other
Empowers People			*			
Builds Team Orientation						
Develops Organizational Capability			**			
Defines Core Values						
Works to Reach Agreement			**			**
Manages Coordination & Integration						
Creates Change						
Emphasizes Customer Focus						
Promotes Organizational Learning			*	*		*
Defines Strategic Direction & Intent						
Defines Goals and Objectives						
Creates Shared Vision				*		

Note: \*\*indicates that males were rated significantly higher than females

\*indicates marginal differences between males and females ( $p < .10$ )