PRISMATIC TRUST: HOW STRUCTURAL AND BEHAVIORAL SIGNALS IN NETWORKS EXPLAIN TRUST ACCUMULATION

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Appendix A

Prismatic trust: Mechanisms and ontology

We propose and elaborate on the idea that prismatic trust is guided by a distinct set of mechanisms, consisting of structural and behavioral elements, and characterized by ontological differences relative to relational, network pathway, and institutional trust. Table 1 summarizes the conceptual differences in mechanisms (as also detailed in the paper) and ontological elements (viz., observability, vulnerability, expectations, and interdependence).

[Insert Table A.1 about here]

Mechanisms: The mechanisms of prismatic trust are fundamentally distinct relative to those of relational, network pathway, and institutional trust. While mechanisms of relational trust are premised on direct experience and encapsulated with dyads, and mechanisms of network pathway trust on flows of referrals and contagion through indirect connections, the mechanism of prismatic trust is based on signals emanating from the network. Prismatic trust mechanisms are also distinct from institutional mechanisms of trust (Granovetter, 1985; Zucker, 1986), which arise from "the safety one feels about a situation because of guarantees, safety nets, or structures" (McKnight, Cummings, & Chervany, 1998: 478). Such mechanisms are impersonal in the sense that the willingness to be vulnerable is promoted by institutional safeguards. In contrast, prismatic trust is grounded in structural and behavioral network signals about an actor's trustworthiness.

Beyond the mechanisms, we identify the ontological elements that differentiate prismatic trust from other trust concepts in terms of the *observability* of interactions, the basis of *vulnerability*, the nature of trustor *expectations*, and the type of *interdependence* between trustor and trustee.

a) *Observability*: The information upon which prismatic trust is based is public in the sense that it requires the social structure and the interactions that occur within it be observable to other actors in the network. Importantly, such spectators, who are *prospective* trustors, may be completely disconnected

from the interactions between the trustee and its current trustors. Such network-wide publicness allows members to easily observe signals indicative of trustworthiness. In this way, a prospective trustor vicariously entrusts a trustee relying both on others' ties and their behaviors with the prospective trustee (McEvily, Perrone, & Zaheer, 2003). Put another way, the network is utilized as a prism by a trustor acting as a spectator. In contrast, relational trust relies on the trustor acting as a *participant* in a dyad that involves private, direct interactions (Blau, 1964; Mayer et al., 1995). Analogously, network pathway trust involves private, but indirect, interactions such that the trustor and trustee are connected through one or more intermediary network actors. The content flowing through the network pathway is private in the sense that it is observable only by the network actors connected to both the trustor and the trustee. With institutional trust, the observability of the trustee goes beyond a bounded network and is public, society-wide. Moreover, it is not simply the trustee's observable behavior that matters, but more importantly the observability of the legitimate behavior of institutional actors and its representatives (e.g., political, judicial, financial) (Zucker, 1986).

b) *Vulnerability:* The source of vulnerability, and the assignment of blame for a violation, differs widely across trust concepts. In the case of relational trust, vulnerability arises from the trustee's decisions and actions towards the trustor. When trust is betrayed, the trustor's response is directed exclusively toward the trustee. With network pathway trust, the source of vulnerability is less concentrated, but localized and extends beyond the trustee to also include the intermediary network actor(s) ("advisors" in Coleman, 1994) who endorse or recommend the trustee. When pathway trust is violated, the trustor's ire is targeted at both the intermediary network actor and the trustee. For prismatic trust, the vulnerability arises from judgements of trustors based on signals coming from other network members. In this regard, the nature of vulnerability is even more distributed to include the network members that provide the signals. The significance of such distributed vulnerability is most evident when there is a betrayal of trust (Elangovan & Shapiro, 1998). In such cases, the reaction is directed toward not just the trustee but also the network itself, which has been found to be unreliable. With respect to institutional trust, the source of vulnerability is diluted due to the complexity of institutions as systems of

interdependent actors responsible for specialized domains of activity across different jurisdictions. Here, a trustor's response to misplaced trust is dispersed across the system of interdependent actors that failed to provide assurances, safeguards, and guarantees.

c) *Expectations*: When expectations are unmet, a tension arises that initiates a dynamic of adjustment. In relational trust, the tension is addressed through negotiations, reformulating joint expectations, and revising mutual understandings, all of which constitute voice (Hirschman, 1970; Ring & Van de Ven, 1994). With network pathway trust, and the absence of a direct, reciprocal relationship, voice is echoed by the intermediary network actor(s). In the case of prismatic trust, voice is less effective due to the absence of both direct and indirect relationships and exit is the only remaining option for the trustor. Indeed, for both relational and network pathway trust, if one were to exit, the costs would be relatively high due to potential contractual obligations, emotional consequences, reputational damage, and the search for, switching to, and investing in, an alternative potential trustee. In contrast, with prismatic trust these exit costs are minimal. For institutional trust, unmet expectations generate pressure and social movements toward reforms of inadequate institutions (such as by tightening banking laws).

d) *Interdependence:* Theoretical accounts of network ties between actors emphasize the interdependence of individual intentions, opportunities, and actions in networks (Krackhardt, 1990). Our conceptualization of interdependence is based on Thompson's (1967) typology. When individuals trust based on their direct experience with each other (i.e., relational trust), the nature of interdependence is reciprocal in the sense that each party's trust and trustworthiness is a function of the other's trust and trustworthiness. In the case of network pathway trust, the interdependence of the trustor and the trustee is sequential in the sense that it is channeled through the intermediary network actor(s). For prismatic trust, a focal actor is influenced by others' decisions to trust the same focal actor, while retaining substantial agency about whom to trust. In this regard, the nature of interdependence is pooled in the sense that there is a common pool of publicly-observable information that prospective trustors rely upon for signals about the trustworthiness of prospective trustees. With regard to institutional trust, trustors drawing on a pool of protective common rules, laws, and regulations, make decisions to trust the *societal* actor (e.g., the

judicial system or the medical profession). Hence, we suggest that the nature of interdependence is pooled at a society-wide level.

Table A.1: Mechanisms and ontology of trust

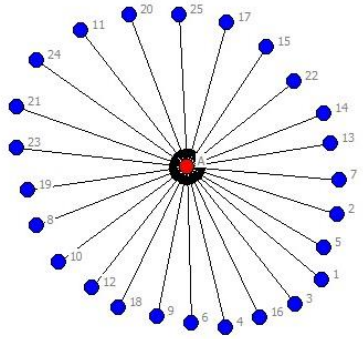
Trust Concepts	*Mechanisms*	*Ontological Elements*			
		Observability	*Vulnerability*	*Expectations*	*Interdependence*
Relational	Direct experience and future expectations	Private, direct	Concentrated	Voice, Direct	Reciprocal
Network: Pathway	Contagion and referral through network ties	Private, indirect	Localized	Voice, indirect	Sequential
Network: Prismatic	Structural and behavioral network signals	Public, network-wide	Distributed	Exit	Pooled, network-wide
Institutional	Systemic safeguards	Public, society-wide	Diluted	Reform	Pooled, society-wide

Appendix B

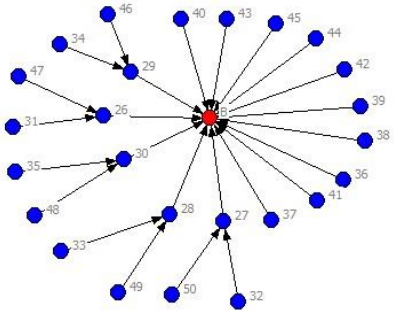
Experiment to assess competence: eigenvector versus degree centrality

Given that the literature is empirically silent on whether status (eigenvector centrality) is a better proxy for trading competence than popularity (degree centrality), we used the opportunity to conduct an experiment to ascertain and validate the relative strength of each of these measures for capturing competence. Using 103 students enrolled in a prestigious European business school in two Masters of Finance programs, we presented subjects with illustrations of varying levels of traders' eigenvector and degree network centrality, as shown below.

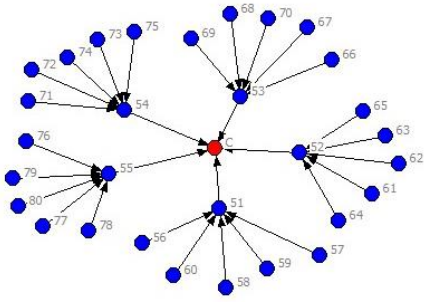
Trader A (25 followers, each followed by 0 others)



Trader B (15 followers, 5 of the them followed by 2 traders each)



Trader C (5 followers, each of them followed by 5 traders)



By randomly assigning the sequence of illustrations to participants, the effects of the treatments (illustrations) are seen through the comparison of scores of the participants observed across the different treatment conditions (Charness, Gneezy, & Kuhn, 2012). We then asked participants to indicate the likelihood of seeking information from the traders and further to assess their trading competence directly using the survey items shown below.

For each of the three traders, what is the probability that you will seek trading information? Please check or tick appropriate box below.

	Very Unlikely	**Unlikely**	**Neither likely nor unlikely**	**Likely**	**Very Likely**
A					
B					
C					

For each of the three traders, how would you rate their trading competence? Please check or tick appropriate box below.

	Very Incompetent	**Incompetent**	**Neither Competent nor Incompetent**	**Competent**	**Very Competent**
A					
B					
C					

For each of the three traders, how would you rate their benevolence (i.e. kind and helpful)? Please check or tick appropriate box below.

	Not at all Benevolent	**Somewhat Non-Benevolent**	**Neither Benevolent nor Non-Benevolent**	**Benevolent**	**Very Benevolent**
A					
B					
C					

We found that participants were more likely to seek information from the trader with higher status (eigenvector centrality) compared to the trader with higher popularity (degree centrality) (t=5.41, $p < 0.01$). Likewise, we found that participants evaluated the trading competence of the higher status trader as greater than that of the trader with higher popularity (t=4.26, $p < 0.01$). While exploratory, we believe that these findings provide compelling empirical support for our theoretical approach emphasizing status as the appropriate signal for competence and thereby trustworthiness.

Appendix C

Robustness checks: Comparing eigenvector and degree centrality

Table C.1: Residualized relative importance analysis: The effect of eigenvector and degree centrality on the accumulation of trust

	(1) Trust accumulation (log) b/se	(2) Trust accumulation (log) b/se	(3) Trust accumulation (log) b/se	(4) Trust accumulation (log) b/se	(5) Trust accumulation (log) b/se	(6) Trust accumulation (log) b/se
Following network degree centrality z-score	-0.0396***	-0.0377***	-0.0382***	-0.0365***	-0.0407***	-0.0378***
	(0.0064)	(0.0067)	(0.0068)	(0.0065)	(0.0070)	(0.0064)
Following network status residualized z-score		0.0150***	0.0148***	0.0150***	0.0137***	0.0137***
		(0.0022)	(0.0022)	(0.0022)	(0.0020)	(0.0020)
Positive sentiments lagged (log)			0.0799***	0.0845***	0.0773***	0.0862***
			(0.0249)	(0.0246)	(0.0247)	(0.0243)
Following network degree centrality z-score X Positive sentiments lagged (log)				-0.0032		-0.0068
				(0.0041)		(0.0048)
Following network status residualized z-score X Positive sentiments lagged (log)					0.0039	0.0050
					(0.0027)	(0.0031)
Following and copying network overlap (log)	2.1923***	2.1847***	2.1824***	2.1819***	2.1832***	2.1824***
	(0.1196)	(0.1184)	(0.1182)	(0.1182)	(0.1183)	(0.1182)
Following and copying network overlap indirect (log)	3.2536**	3.1574**	3.1564**	3.1718**	3.0955**	3.1095**
	(1.2801)	(1.2403)	(1.2397)	(1.2465)	(1.2271)	(1.2306)
Discussion and copying network overlap (log)	1.5442***	1.4689***	1.4602***	1.4651***	1.4355***	1.4384***
	(0.2273)	(0.2068)	(0.2040)	(0.2050)	(0.1972)	(0.1977)
Discussion and copying network overlap indirect (log)	1.2298**	0.9669**	0.9490**	0.9922***	0.7327**	0.7581**
	(0.5086)	(0.3857)	(0.3733)	(0.3755)	(0.3118)	(0.3323)
Network incentive dummy	0.3010***	0.2984***	0.2972***	0.2969***	0.2969***	0.2962***
	(0.0469)	(0.0454)	(0.0453)	(0.0453)	(0.0454)	(0.0453)
Performance ranking (log)	0.0057***	0.0056***	0.0056***	0.0056***	0.0057***	0.0057***
	(0.0013)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
High risk trades (log)	0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0005)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Number of communications to others lagged (log)	0.1225***	0.1069***	0.0786***	0.0797***	0.0749***	0.0760***
	(0.0274)	(0.0243)	(0.0204)	(0.0203)	(0.0193)	(0.0194)
Number of communications to self lagged (log)	-0.0171	-0.0125	-0.0137	-0.0148	-0.0115	-0.0131
	(0.0185)	(0.0177)	(0.0174)	(0.0174)	(0.0174)	(0.0173)
Number of communications received lagged (log)	-0.0081	-0.0090	-0.0093	-0.0095	-0.0088	-0.0091
	(0.0116)	(0.0116)	(0.0116)	(0.0115)	(0.0115)	(0.0115)
Constant	0.0473***	0.0483***	0.0481***	0.0481***	0.0481***	0.0481***
	(0.0014)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Trader fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Week fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	608,096	608,096	608,096	608,096	608,096	608,096
R^2	0.8570	0.8586	0.8588	0.8588	0.8588	0.8589

Table C.2: Orthogonalized relative importance analysis: The effect of eigenvector and degree centrality on the accumulation of trust

	(1) Trust accumulation (log) b/se	(2) Trust accumulation (log) b/se	(3) Trust accumulation (log) b/se	(4) Trust accumulation (log) b/se	(5) Trust accumulation (log) b/se	(6) Trust accumulation (log) b/se
Following network degree centrality z-score	-0.0388***	-0.0246***	-0.0255***	-0.0254***	-0.0267***	-0.0263***
	(0.0066)	(0.0083)	(0.0084)	(0.0081)	(0.0077)	(0.0077)
Following network status orthogonalized z-score		0.0231***	0.0227***	0.0227***	0.0207***	0.0208***
		(0.0037)	(0.0037)	(0.0036)	(0.0032)	(0.0032)
Positive sentiments lagged (log)			0.0927***	0.0929***	0.0689**	0.0697**
			(0.0257)	(0.0257)	(0.0297)	(0.0307)
Following network degree centrality z-score X Positive sentiments lagged (log)				-0.0002		-0.0006
				(0.0046)		(0.0039)
Following network status orthogonalized z-score X Positive sentiments lagged (log)					0.0081	0.0081
					(0.0070)	(0.0071)
Following and copying network overlap (log)	2.1740***	2.1643***	2.1614***	2.1614***	2.1613***	2.1612***
	(0.1138)	(0.1127)	(0.1124)	(0.1124)	(0.1124)	(0.1124)
Following and copying network overlap indirect (log)	2.9274**	2.8630***	2.8634***	2.8641**	2.8110**	2.8134**
	(1.1387)	(1.1111)	(1.1110)	(1.1124)	(1.0959)	(1.0979)
Discussion and copying network overlap (log)	1.5474***	1.4762***	1.4649***	1.4652***	1.4473***	1.4483***
	(0.2344)	(0.2189)	(0.2157)	(0.2156)	(0.2115)	(0.2121)
Discussion and copying network overlap indirect (log)	1.3380**	1.0861**	1.0678**	1.0702**	0.8490**	0.8572**
	(0.5375)	(0.4815)	(0.4655)	(0.4357)	(0.3784)	(0.3768)
Network incentive dummy	0.3184***	0.3150***	0.3133***	0.3132***	0.3132***	0.3131***
	(0.0470)	(0.0458)	(0.0457)	(0.0456)	(0.0457)	(0.0457)
Performance ranking (log)	0.0052***	0.0054***	0.0054***	0.0054***	0.0055***	0.0055***
	(0.0013)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
High risk trades (log)	0.0002	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Number of communications to others lagged (log)	0.1312***	0.1171***	0.0841***	0.0842***	0.0768***	0.0769***
	(0.0288)	(0.0262)	(0.0224)	(0.0218)	(0.0185)	(0.0185)
Number of communications to self lagged (log)	-0.0193	-0.0178	-0.0193	-0.0194	-0.0182	-0.0184
	(0.0192)	(0.0186)	(0.0183)	(0.0180)	(0.0175)	(0.0176)
Number of communications received lagged (log)	-0.0099	-0.0112	-0.0114	-0.0114	-0.0103	-0.0104
	(0.0115)	(0.0116)	(0.0116)	(0.0115)	(0.0114)	(0.0114)
Constant	0.0466***	0.0474***	0.0471***	0.0471***	0.0471***	0.0471***
	(0.0014)	(0.0013)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
N	641,501	641,501	641,501	641,501	641,501	641,501
R^2	0.8526	0.8537	0.8539	0.8539	0.8540	0.8540

Appendix 2

Variance-Covariance Matrix of Key Variables											
		1	2	3	4	5	6	7	8	9	10
Depednent variable											
1	Trust accumulation (log)	0,13									
Independent variables											
2	Status (log)	1,17	560,16								
3	Positive sentiments (log)	0,01	0,11	0,01							
Financial controls											
4	Performance ranking (log)	0,00	-0,19	0,00	0,03						
5	High risk trades (log)	-0,03	1,96	0,00	-0,01	2,45					
Networking structure controls											
6	Following and copying network overlap (log)	0,00	0,06	0,00	0,00	0,00	0,00				
7	Communication and copying network overlap (log)	0,00	0,00	0,00	0,00	0,00	0,00	0,00			
Networking behavior controls											
8	Networking incentive dummy	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00		
9	Number of communications to others lagged (log)	0,02	0,18	0,01	0,00	0,00	0,00	0,00	0,00	0,02	
10	Number of communications to self lagged (log)	0,01	0,15	0,01	0,00	0,00	0,00	0,00	0,00	0,02	0,02
11	Number of communications received lagged (log)	0,00	0,10	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01