International Journal of Cultural and Social Studies (IntJCSS)
December 2024: Volume 10 (Issue 2) / e-ISSN : 2458-9381

Araştırma Makalesi ● Research Article

A Novel Framework for the Study of Culturally Evolved Chivalric Disposition in Multiple Social Science Applications

Matthew Muscat-ınglott,[a]
[a] Malta College of Arts, Science & Technology
matthew.muscat.inglott@mcast.edu.mt
ORCID: 0000-0002-2091-3494

ARTICLE INFO

Article history:
Received: 30.01.2024
Received in revised form: 12.11.2024
Accepted: 13.11.2024

Keywords:
Chivalry,
chivalrous values,
chivalric disposition,
chivalric culture complex,
cultural evolution.

ABSTRACT

Some scholars have argued that medieval-style chivalry has made a far greater imprint on recent history than is commonly recognised. Themes surrounding chivalry and knights in shining armour meanwhile remain popular and influential in contemporary culture. Yet, current definitions of the phenomenon associate it with a fairly limited range of paternalistic behaviours, like paying bills or opening doors for others. The paper actively challenges this view by arguing that the impact of an extant widespread uptake of chivalrous values has been significantly underestimated in areas of vital interest to social scientists. It furthermore proposes a novel theoretical approach for understanding chivalric disposition as a function of cultural evolutionary processes acting on cultural variants in the form of values dating back at least as far back as the classical era. Employing an initial scale-validation strategy, the study began with a pool of 48 items generated deductively from the literature on medieval chivalry reflecting its key prevailing characteristics, and presented them via online questionnaire to a sample of 242 participants. The resulting data were subjected to exploratory and confirmatory factor analyses, internal reliability testing, and in-depth qualitative assessment. Following the analysis, 21 items were retained, modeling chivalrous values in three mutually constitutive, inextricably linked dimensions, namely, fortitude, deference and virtue. A revised definition of chivalry is thereby proposed, along with a working chivalric disposition scale for further validation and refinement. Ultimately, the paper seeks to provide impetus for further interdisciplinary research on the broader effects of chivalric disposition across a wide range of potential social science applications.

Atıf Bilgisi / Reference Information

Matthew, M. (2024). A Novel Framework for the Study of Culturally Evolved Chivalric Disposition in Multiple Social Science Applications, Uluslararası Kültürel ve Sosyal Araştırmalar Dergisi (UKSAD) 10 (2), s. 1-18.

* DOI: 10.46442/intjcss.1428234

** Sorumlu yazar: Matthew Muscat-ınglott, matthew.muscat.inglott@mcast.edu.mt

Introduction

> "*It is the great battle of the Cross and the Qur'an […] if Heaven requires the sacrifice of our lives, there can be no better occasion than this*." (Grand Master Jean de Valette, in Attard, 2022: 45)

In the lead-up to the 1565 battle for Malta between the Ottoman Muslim Turks and the European Christian Knights based on the islands, Grand Master de Valette famously delivered the foregoing words as a final appeal to his knights' sense of chivalry. Scholars argue that, much as propagandists have long since taken for granted (Kateb, 2004), extant widespread chivalric disposition ensures rousing words like de Valette's continue to resonate not only among combatants, but with far broader audiences (Henneberry, 2008). Frantzen (2004) proposed that chivalry was actively promoted and idealised as a model of behaviour during the mass recruitment campaigns of the First World War. McCarthy (2022) similarly proposed that a resurgence of medieval-style chivalry was largely responsible for much of the violence and turmoil marring the major political and historical developments of the 20th century. While the implications of chivalry need not always be so dire or deadly, such claims nonetheless raise several pressing questions. How is it that people can be so moved by chivalrous ideals to extreme forms of behaviour? With whom do such ideals mostly resonate, and why? And perhaps most importantly, what are the broader implications for a population seduced by chivalrous ideals in other contexts besides war?

Themes revolving around chivalry and knights in shining armour tend to maintain their allure in genres like neo-medieval fantasy, Arthurian legends, romances and even contemporary superhero narratives in movies, television and literature. Whether rendered against medieval or modern backdrops, fictional characters like the knights of Westeros in HBO's *Game of Thrones* (MacInnes, 2020), or Tony Stark in Marvel's *Iron Man* (Nowotny, 2016) continue to captivate audiences with their depictions of the heroic knight archetype. It is only fitting that Tony Stark, in his thoroughly revamped 21st century suit of armour, is a self-made billionaire in a Western social order that, at least in the Nietzschean postmodern sense has abandoned its worship of God, favouring instead a devoted worship of capital. From medieval "holy" wars for sacred lands to contemporary "just" wars for economic interests, as Banner (2015) aptly argues, it is belief in higher, supposedly transcendent, powers that enables continuing justification of war, keeping its atrocities "out of the glare of rational thought" (p9). What else, we might ask, does extant contemporary chivalry continue to obscure from the glare of rational thought? To what extent, as Herman and Chomsky (1994) might similarly question, do lasting chivalrous ideals continue to assuage the manufacturing of public consent?

Defining chivalry

Medieval chivalry has been described as a religious, moral and social set of codes and customs (Hearnshaw, 1996), as well as an ideological framework (Kaeuper, 2005). Others have described it as an unwritten convention (Jacob, 1996), an ethos (Napier, 2017), or a spirit rather than an institution (Hearnshaw, 1996). While it shares several core values with earlier warrior codes like those of the Spartans and Romans, as well as with contemporaneous groups like the Muslim Mujahidin and Japanese Samurai (Saul, 2011; French, 2017; Terry-Roisin, 2019; Takeda, 2021), the chivalry particular to the Christian European knights has been associated with an elaborated yet consistent panoply of attitudes, beliefs and associated behaviours. Among its prevailing qualities were prowess, fortitude, honour and bravery (Attard, 2022;

Banner, 2015; De Charny, 2005; French, 2017; Hearnshaw, 1996; Terry-Roisin, 2019; Takeda, 2021). These were typically accompanied by humility, courtesy, loyalty, obedience and graceful service (Jacob, 1996; Nicholson, 2010; Prestage, 1996; Banner, 2015; Napier, 2017), justice, truthfulness, faithfulness, prudence, temperance and piety (Hearnshaw, 1996; Attard, 2022), as well as martyrdom or other forms of self-sacrifice for one's holy land, lord or god (Haag, 2014; Shears, 1996). Jacob (1996) further qualifies chivalrous deference as doing nothing contrary to the interests of one's lord. Knights were also expected to love adventure and challenges, take up just causes, as well as protect and show compassion for the weak (Hearnshaw, 1996; Nicholson, 2010). Banner (2015: 12) succinctly describes the quintessential chivalrous knight as, "... so loyal that their determination is never lost, so courageous that they never feel fear, and so skilled in battle that they never die."

These all fit well with the second of two definitions given by the OED (2023) which describes chivalry as a religious and moral system of behaviour "perfect" knights in the (European) Middle Ages were expected to follow. The OED's first definition, however, describes a much narrower set of present-day behaviours performed specifically by men in their interactions with women. Examples include such acts as opening car doors for others or paying for a meal in a restaurant. Assuming both definitions are true *and* medieval chivalry has its roots in even older codes of the Spartans and Romans (Saul, 2011; French, 2017; Terry-Roisin, 2019; Scaglione, 2023), then a direct lineage emerges from at least as far back as the classical era, through the waypoint of medieval Europe, up to the present day. Medieval Europe represents a crucial nexus, since prevalent ideas during this period were bound to permeate through the conduit of ensuing European colonialism. The extensive cultural imperialist project that followed saw, and arguably continues to see, the imposition of European/Western values and traditions on much of the rest of the globe (Hamm & Smandych, 2005). Several important theoretical considerations directly follow.

Theorising Chivalry for Social Science Applications

To be chivalrous implies adherence to a set of abstract ideas, or more specifically, having beliefs in the goodness or exaltedness of those ideas. Schwartz (2012) would describe these as *values*, or more specifically, as belief-emotion pairings like, for instance, belief in the virtue of courage among film audiences and readers of poetry, paired with the experience of profound emotions like admiration, inspiration, pride, hope or gratitude. Cultural evolution theory in the tradition of Cavalli-Sforza and Feldman (1981), Boyd and Richerson (1985; 2011), and Laland (2017) conceptualises such beliefs as cultural variants, amenable to laws of Darwinian evolution as a function of their variation, inheritance and differential fitness. Cultural variants in the form of values can spread in human populations via social learning and other cultural transmission mechanisms such as prestige bias, a plausible explanation given the strong association between chivalry and social status in medieval times (Banner, 2015). We know that chivalrous codes, customs and conventions were "copied" by knights across Europe, for instance, from French knights to German knights in the 11th and 12th centuries (Atkins, 1996), and just like earlier warrior codes, were transmitted from one generation to the next (French, 2017).

If a unified set of cultural variants makes a "culture complex", then the values associated with medieval European chivalry (as well as its precursory forms) that continue to endure as a function of cultural evolution, can be operationally defined collectively as the "Chivalric Culture Complex" (CCC). If the CCC unifies popular definitions of *medieval* and *contemporary* extant chivalry as two points on a single cultural evolutionary timeline, however, then a marked asymmetry emerges with respect to the range and scope of

chivalry today. Viki et al. (2003), for instance, posited a gendered form of "paternalistic chivalry" closely aligned with the OED's first definition of chivalry as a bounded set of behaviours enacted mostly by men in their dealings with women. Grabe et al. (2006) similarly tested the "chivalry hypothesis" by looking at gender biases and harshness of sentencing in North American crime data, positing the existence of a form of gender-biased "patriarchal chivalry". Considering that *medieval* chivalry is recognised as having driven fighting knights to relatively extreme forms of human behaviour, popularly defined *contemporary* chivalry, by comparison, appears to portray a rather underwhelming and fairly limited range of behaviours. Consequently, the impact of chivalry throughout modernity has likely been, and continues to be, undervalued and underestimated.

From a critical theoretical perspective, impoverished interpretations of extant contemporary chivalry run the risk of obscuring its actual effects on broader, fundamentally unjust social, political and economic systems. Accordingly, a better understanding of the CCC, who it afflicts, and why, can help shine a light on the surreptitious machinations of those with the power to shape cultural narratives in their own interests. More comprehensive research on chivalry as an evolving CCC could furthermore yield valuable insights into human behavior among individuals and populations, and provide additional context for a potentially broad spectrum of cultural, social, psychological, and political research problems. In issues relating to mental health or social work, reactions and responses to major events like pandemics or war, mass consent to unjust economic and political systems, receptivity to misinformation and disinformation, attitudes towards inclusion in education and society, or even the interplay between sport, leisure and society, measuring uptake of the CCC has potential to stimulate rich and provocative new insights and debates. If uptake of combinations of values can be defined as a "disposition" (West et al., 2018) in the context of measurement, then uptake of the CCC can likewise be termed "Chivalric Disposition" (CD). Before hypothesising about its effects on other mental states, behaviours or outcomes, however, development of a valid means of measuring CD is essential. The present study was consequently aimed at addressing this primary goal, and advocating more generally for further research on the potential effects of the CCC and its uptake in the form of CD on culture, individuals, and society.

Method

Delimiting Chivalry

Peterson and Seligman (2004) created a contemporary framework of actionable values mostly compatible with popular interpretations of medieval chivalry, including perseverance, fairness, leadership, humility, self-regulation and spirituality, among others. Black and Reynolds' (2016) similarly devised a moral identity questionnaire (MIQ) ideal for measuring values like fairness and integrity, reflective of chivalrous values in the present-day context. Qualities like empathic concern, an important component of prosocial behaviour (Luengo Kanacri et al., 2021) in the context of protecting the vulnerable or sick, also apparently fit well with the panoply of values associated with medieval chivalrous knights. Prowess, or personal excellence, can also be interpreted in terms of existing constructs and their associated scales in the literature like personal growth (Bartley & Robitschek, 2000).

A review of such constructs and their associated scales, however, quickly raises the spectre of an exceedingly complex and potentially unwieldy selection of disparate tests, likely to be both time-consuming for participants and impractical for social science researchers. Combining separately validated instruments

would also likely yield statistically complex results with less predictive power than a more parsimonious, integrated measure of CD. To maintain the integrity of the CCC as a singular, coherent and contextualised unitary construct, therefore, the study began from the firm grounding of the literature specifically focused on medieval chivalry as its most explicit and overt historical manifestation. A deductive approach was taken to source a pool of items directly from this body of literature and assess their uptake in contemporary settings. The study proceeded according to a general scale-validation strategy, by generating and refining the item-pool, and subjecting it to a quantitative analysis with added qualitative elements to safeguard contextual and theoretical fidelity. Accordingly, a more specific set of questions were formulated, as follows:

1) Which items best capture the CCC and its uptake in the form of CD in contemporary settings?
2) What is the nature of the CCC in terms of its dimensionality, and how should it be more specifically defined?
3) What working scale and associated quantitative output/s can be proposed for initiating further research on the CCC and its quantifiable uptake in the form of CD?

Instrumentation

The key qualities associated with the chivalrous knights derived from the literature were prowess, fortitude, honour, bravery, humility, courtesy, loyalty, obedience, service, justice, truthfulness, faithfulness, prudence, temperance, piety, martyrdom, self-sacrifice, protection and compassion (Attard, 2022; Banner, 2015; French, 2017; Haag, 2014; Hearnshaw, 1996; Jacob, 1996; Napier, 2017; Nicholson, 2010; Prestage, 1996; Shears, 1996; Takeda, 2021; Terry-Roisin, 2019). A pool of 60 statements was generated by sourcing definitions of these terms from the online Mirriam-Webster and Cambridge English dictionaries, as well as Dictionary.com. The statements were edited and simplified to avoid repetition, and reduced to a set of 48 items for inclusion in an online *Google Forms* questionnaire. Items were worded to estimate the value participants placed on the qualities they described, by preceding each statement with the phrase, "It is important for me to…". Five-point Likert scales with the labels 1 = Strongly Disagree and 5 = Strongly Agree accompanied each item.

Sampling

The study was carried out at the Malta College of Arts, Science & Technology, with ethical clearance granted by the college institutional review board in late November 2023. A sample of 242 participants were subsequently recruited via mixed opportunity and convenience sampling. The participants were either degree students at the college (reading for degrees in either *Sport, Exercise & Health*, or *Health & Social Care Management*), college staff, or adults within the personal networks of college staff. The minimum target sample size was estimated by multiplying the total number of variables by five [48 * 5 = 240] (MacCallum et al., 1999). Participants identifying with the female gender comprised 57% (n = 139), and male, 42% (n = 102). One participant reported identifying with neither gender. Participants between the ages of 16 and 73 responded, with a mean age of 29.64 years (SD = 13.17). The majority of the participants were Maltese (83%, n = 201), followed by 11% (n = 26) from the United Kingdom, and the remainder spread relatively evenly (n < 4) between Italy, Libya, Macedonia, Serbia, Turkey, Other (EU [European Union]) and Other (non-EU).

Data analysis

The data were imported into *JASP (v0.18.1)* open-source statistical analysis software. A further 13 redundant items were immediately eliminated based on preference for a low mean, high variance, and high item-total correlation. The main analysis was then carried out on 35 remaining items in three main phases, namely, exploratory factor analysis (EFA), reliability testing, and confirmatory factor analysis (CFA). A Kaiser-Meyer-Olkin test indicated the sampling was adequate for factor analysis (0.88), while Bartlett's test ($\chi^2 = 3137$, $df = 595$, $p < .001$) confirmed its suitability for data reduction. For the EFA, an oblique promax rotation was selected, assuming correlated factors, with principal axis factoring to maximise fit indices. Several iterations were performed with the number of factors changed manually and incrementally from two to seven, with a view to identifying theoretically meaningful item clusters.

The most coherent factor structure converged on three qualitatively meaningful dimensions, which were entered into a round of reliability testing using Cronbach's α and McDonald's ω (with minimum thresholds of .70 in both instances). Selected items were eventually retained on the basis of qualitative/theoretical fit, item-total correlation (ITC), and their effect on the overall internal reliability estimates. This process resulted in a final selection of 21 items across the three factors (8 + 6 + 7). Following the factor identification and specification processes, the items were finally subjected to a standard CFA. A one-factor model comprising all items was assessed first, followed by a three-factor model derived from the previous steps. Model fit in both instances was assessed using the Comparative Fit Index (*CFI*), Tucker-Lewis Index (*TLI*), Root Mean Square Error of Approximation (*RMSEA*) and Standardised Root Mean Squared Residual (*SRMR*). Values for the *CFI* and *TLI* were considered satisfactory if above .90, and below .08 for *RMSEA* and *SRMR*. Figure 1 summarises the methodological plan and full item-reduction process.

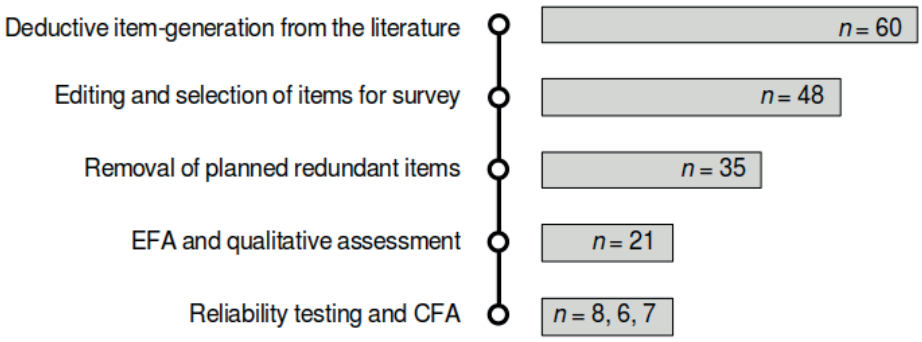


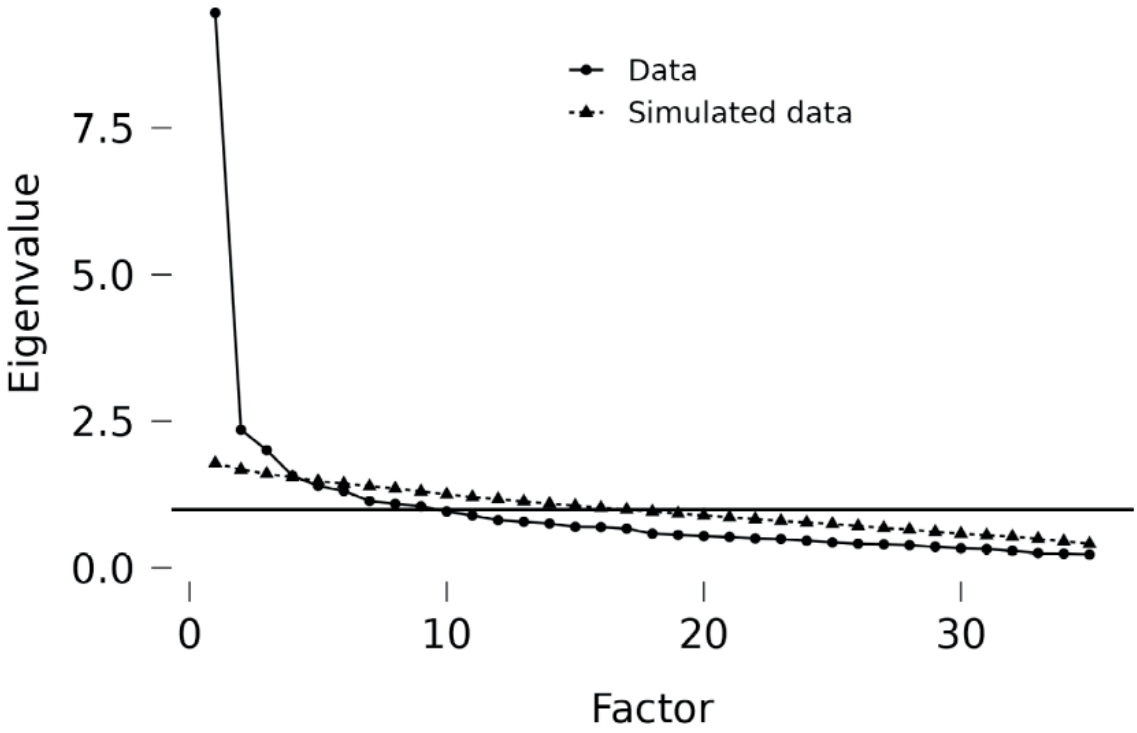
Figure 1. Full item reduction processes, *n* refers to number of items

Results

Results of Factor Identification and Specification Processes

The scree plot in Figure 2 visually illustrates the appropriateness of a three-factor solution following the EFA, and prompted an in-depth qualitative assessment of the three main factors.

Figure 2. Scree plot for EFA with simulated data included [EDIT LABEL]



The items originally loading on Factor 1 (Table 1) cumulatively described strength, readiness to act and use force to protect self or others when necessary, resoluteness once action is initiated, steadfastness, perseverance, self-discipline, as well as capacity to endure hardship and maintain loyalty unconditionally. The term *Chivalric Fortitude* (*C-For*) was chosen to denote the underlying construct. Table 1 contains the ITCs and descriptive statistics for the eight items retained, yielding good internal reliability (ω = .84, α = .80).

Factor 1 Items – Chivalric Fortitude (C-For)	***ITC***	***Mean***	***SD***
F1: It is important for me to be ready, willing and able to use force in self-defence when necessary.	.491	4.178	0.905
F2: It is important for me to protect those who can't protect themselves.	.489	4.326	0.732
F3: It is important for me to have exceptional self-control and self-discipline.	.562	4.227	0.811
F4: It is important for me to be exceptionally strong in mind and spirit.	.621	4.103	0.831
F5: It is important for me to stay strongly committed to supporting a person or group I have promised my loyalty to.	.506	4.277	0.806
F6: It is important for me to be resolute and staunch in completing my duties, no matter what.	.607	3.901	0.887
F7: It is important for me to be ready and willing to endure hardship to uphold a strong belief.	.644	3.950	0.914
F8: It is important for me to be the one who shows mental or moral strength in moments of extreme difficulty.	.618	4.289	0.756

Table 1. Chivalric fortitude descriptives

The items loading on Factor 2 (Table 2) described a tendency to follow the rules, obedience, respect for authority and appearing/behaving with seriousness. These cumulatively portray a humble, cooperative and subservient demeanour, and were qualitatively interpreted as *Chivalric Deference (C-Def)*. The factor yielded good internal reliability (ω = .83, α = .82).

Factor 2 Items – Chivalric Deference (C-Def)	***ITC***	***Mean***	***SD***
D1: It is important for me to be loyal and obedient, and show respect for authority.	.694	3.963	1.075
D2: It is important for me to be modest in my appearance, and avoid extravagant clothes or adornments.	.481	3.545	1.134
D3: It is important for me to follow the rules, even when they don't make immediate sense.	.617	3.157	1.097
D4: It is important for me to act in a way that supports a general state of order and obedience.	.673	3.723	1.003
D5: It is important for me, if unsure, to give my superiors the benefit of the doubt.	.484	3.450	0.960
D6: It is important for me to behave with seriousness of manner, appearance and language.	.593	3.946	0.952

Table 2. Chivalric deference descriptives

The items loading on Factor 3 (Table 3) described a sense of honour, the championing of good against evil, forgiveness, honesty and disdain for cheating. The items also incorporated an element of austerity or asceticism, in the denial of material as opposed to moral rewards. Ultimately, they portrayed belief in the value of goodness and purity, and were defined collectively as *Chivalric Virtue (C-Vir)*. This selection of items yielded weaker, but acceptable internal reliability (ω = .73, α = .73).

Factor 3 Items – Chivalric Virtue (C-Vir)	***ITC***	***Mean***	***SD***
V1: It is important for me to never behave in a dishonest way just to get what I want.	.438	4.211	0.870
V2: It is important for me to be impartial and fair in my treatment of others, whoever they are and whatever the stakes.	.452	4.107	0.818
V3: It is important for me to be able to forgive, when I have the power to do so.	.388	4.004	0.945
V4: It is important for me to be modest about my accomplishments, and never boast or brag.	.470	4.103	0.860
V5: It is important for me to choose honour and self-respect over money or possessions.	.430	4.194	0.844
V6: It is important for me to be that person others know will never steal, cheat or lie.	.440	4.492	0.826
V7: It is important for me to always champion good against evil.	.505	4.165	0.923

Table 3. Chivalric virtue factor

Finally, internal reliability testing was repeated for all 21 items combined, to assess the uni-dimensionality of the scale as a single measure of general CD. This yielded good internal reliability (ω = .89, α = .88), suggesting that the items were indeed cumulatively referencing a coherent underlying structure. Reliability statistics and fit indices for each of the three factors, as well as the 21 items overall are summarised in Table 4.

	C-Vir	***C-For***	***C-Def***	***General***
Cronbach's α	.733*	.801*	.821*	.884*
McDonald's ω	.734*	.840*	.826*	.885*
RMSEA	.049*	.070*	.059*	.088
SRMR	.041*	.048*	.032*	.080

Table 4. Summary reliability and fit statistics for each factor and overall (general)
* Denotes acceptable values in terms of nominated thresholds

Results of the CFA and Additional Tests

All 21 items were included in a one-factor model and subjected to standard CFA. Following the recommendations of Wheaton et al. (1977) a high ratio of χ^2/df (= 2.88) was obtained (χ^2 = 545.53, *df* = 189, $p < .001$), exceeding the accepted threshold (< 2). The one-factor model therefore represented a relatively poor fit, with additional fit indices further indicating a poor to marginal fit (*CFI* = .76, *TLI* = .74, *RMSEA* = .09, *SRMR* = .08). These values were then compared to the CFA output for the three-factor model developed and refined through Steps 1 and 2 (Figure 3).

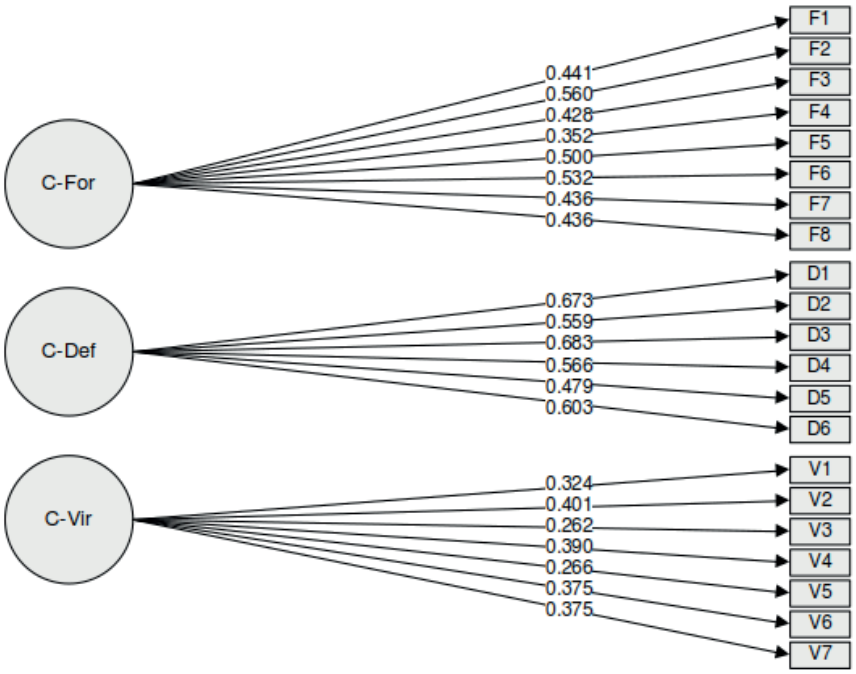


Figure 3. Path diagram for three-factor model with factor loadings

According to the χ^2/df ratio, the three-factor model yielded an acceptable value of 1.58 (χ^2 = 294.78, *df* = 186, $p < .001$). Additional fit indices also indicated a better fit with the three dimensions of *C-For*, *C-Def* and *C-Vir* taken into account (*CFI* = .93, *TLI* = .92, *RMSEA* = .05, *SRMR* = .05). Covariance among the

dimensions was high (Table 5), and correlations were strong (Table 6).

	C-For	***C-Def***
C-Def	*Cov* = .650, $p < .001$	
C-Vir	*Cov* = .616, $p < .001$	*Cov* =.560, $p < .001$

Table 5. Covariance matrix for the three dimensions, where *p* values relate to H_0: *Cov* = 0

	C-For	***C-Def***
C-Def	$r = .548$, $p < .001$	
C-Vir	$r = .469$, $p < .001$	$r =.438$, $p < .001$

Table 6. Correlation matrix for the three dimensions

The high shared variance was combined with relatively low (< .50) Average Variance Explained (AVE) values for *C-For* (= .40), *C-Def* (= .447) and *C-Vir* (= .282). High covariance and low AVE values in the emerging factors indicated a high degree of overlap. Despite good fit of the three-factor model to the data, therefore, the factors were clearly not entirely independent, and appeared to be working together to explain a theoretically plausible higher-order construct. Interpretation of the AVE values in the context of high common variance, as well as strong internal reliability of the overall 21-item selection, in other words, was taken as compelling evidence for the existence of a coherent higher-order construct, with three inextricably linked, mutually constitutive dimensions. Descriptive statistics for the three dimension means are given in Table 7.

Statistic	***C-For***	***C-Def***	***C-Vir***
Eigenvalues	6.522	1.778	1.676
Total Variance Explained (%)	59.46	16.22	15.29
Mean	4.157	3.631	4.182
Standard Deviation	0.569	0.755	0.540
Min	1.500	1.500	1.714
25th Percentile	3.750	3.167	3.857
50th Percentile	4.125	3.667	4.286
75th Percentile	4.625	4.167	4.571
Max	5.000	5.000	5.000
Skewness	-0.829	-0.582	-0.913
Standard Error (SE) of Skewness	0.156	0.156	0.156
Skewness/SE of Skewness	-5.314	-3.731	-5.853

Table 7. Descriptive statistics for the three dimensions

Discussion

Dimensionality of the CCC

Whether fighting in the crusades or competing in tournaments, the chivalrous knights were famously driven to continuously prove themselves (Barthélemy, 2018). *C-For* captures this drive in terms of the prowess, honour, bravery and propensity to seek adventure scholars have formally associated with medieval chivalry (Hearnshaw, 1996; French, 2017; Terry-Roisin, 2019; Takeda, 2021). Stories of great skill and courage in literature, entertainment and mass media have historically elevated soldiers, athletes or indeed anyone

taking on sufficiently difficult challenges, to the status of heroes and legends (Balot, 2004; Gervais, 2014; Goethals & Allison, 2012). Skill and prowess give rise to prestige, as Henrich et al. (2015) argue, reinforcing prestige-based social hierarchies throughout human history regardless of levels of egalitarianism. Prestige bias as a cultural transmission mechanism works by increasing the likelihood of individuals in a group with lower status copying those with high status (Boyd & Richerson, 2011; Henrich et al., 2015). The relationship between prestige and fortitude helps explain the cultural evolutionary success over time of values comprising *C-For*, and accordingly, why values deduced directly from the literature on medieval chivalry evidently persist in contemporary settings.

Intuitively, however, the qualities comprising *C-For* cannot be considered chivalrous on their own. Unchecked, excess *C-For* risks turning into less desirable inclinations like recklessness, selfishness, aggression or excessive idealization of violence. *C-Def* duly intercedes at this juncture, encouraging restraint, modesty, as well as maintenance of servility and consideration for others and the prevailing order. Scholars of chivalry have noted that courtesy and graceful service were key qualities for the chivalrous medieval knights (Jacob, 1996; Prestage, 1996; Napier, 2017), along with a general reluctance to act in conflict with the interests of one's lord, king or God (Jacob, 1996). On its own, deference can be understood as an important feature of human cooperation (Richerson et al., 2016). Indeed, as Souza and Bingham (2019) posited, it is a form of deference in protohumans that may have sparked the evolution of modern humans, by facilitating consistent and enforceable group cooperation. In the context of prestige and chivalry, fortitude and deference initially appear to be at odds, since as Henrich and Gil-White (2001) explained, deference is only adaptive in harmoniously cooperating groups when individuals with lower levels of prestige defer to those with higher levels. Chivalry provides added insight on this between-individuals antagonism by creating a state in which both conditions are present simultaneously within the same individual. Chivalry manifests, in other words, when deferential behaviour is punctuated by an accompanying, clearly present yet voluntarily withheld, capacity to exercise dominance.

Rather than being a dimension merely in need of constraint, however, *C-For* also requires active direction in order for it to be truly chivalrous. *C-Vir*, in this sense, ensures chivalrous actions can be suitably guided by a devotion to some higher purpose, purer ideal, or even a deity. Cultural evolution theorists have argued that the prosocial and cooperative implications of religious ideas render them highly culturally adaptive over time (Norenzayan et al., 2016). *C-Vir* can be understood, in this sense, as a component of CD evolving from the piety, truthfulness and fairness popularly associated with the Christian knights (Hearnshaw, 1996). By projecting back onto *C-Def* and *C-Vir*, meanwhile, *C-For* likewise provides strength and conviction needed to act virtuously and courteously. It provides the impetus and preparedness to fight for others, for one's in-group, as well as for abstract principles with equal fervour. This can help explain the resounding success of propaganda campaigns appealing for the waging of war against abstract, often vague, principles (Frantzen, 2004: Kateb, 2004; McCarthy, 2022). Preparedness to die in battle fighting, for instance, "evil", or "terror" (Bellamy, 2005; Graham, 2013) as a matter of duty or "service", is a stark reminder of the power of fortitude when acting on a combination of virtue and deference. It also serves to illustrate a quantitatively and qualitatively substantiated interdependence between the three dimensions, as necessary and mutually constitutive components of the CCC and its uptake in the form of CD.

Proposed Measures

Given the differences in total variance explained by each factor (derived from their eigenvalues), a

weighting scheme is proposed for representing the interdependent dimensions collectively in a unitary statistic suitably representative of overall CD as a coherent higher-order construct. The weights of 60% for *C-For*, and 20% each for *C-Def* and *C-Vir*, normalised to sum to 100, are proposed as a simplification of the quantitatively derived variances of .59, .16 and .15, as well as qualitatively derived theoretical centrality of *C-For* in relation to *C-Def* and *C-Vir*. As output variables, however, the dimension means and overall weighted mean demonstrated left skewness above Kim's (2013) threshold of a 3.29 (Skewness to SE of Skewness ratio based on a sample size between 50 and 300). High negative skew precludes the variables from use in many of the parametric statistical techniques adopted by social scientists, like regression modeling, analyses of covariance (ANCOVA), or mediation/moderation modeling. A third-power transformation of the means was therefore introduced, resulting in more appropriate frequency distributions (Table 8). Figure 4 specifically illustrates the change in distribution, and also includes an overall estimate of CD in the form of a more intuitive "CD Index" (CDI).

	Mean	***SD***	***Skewness***	***SE of Skewness***	***Sk/SE of Sk***
***C-For*^{3}**	75.680	27.708	0.094	0.156	0.603
***C-Def*^{3}**	53.806	28.705	0.423	0.156	2.712
***C-Vir*^{3}**	76.662	26.333	-0.030	0.156	-.192
***Ave*$_{Weighted}$^{3}**	69.766	23.819	0.159	0.156	1.019
CDI	.558	0.012	0.159	0.156	1.019

Table 8. Descriptive statistics for the three dimensions transformed

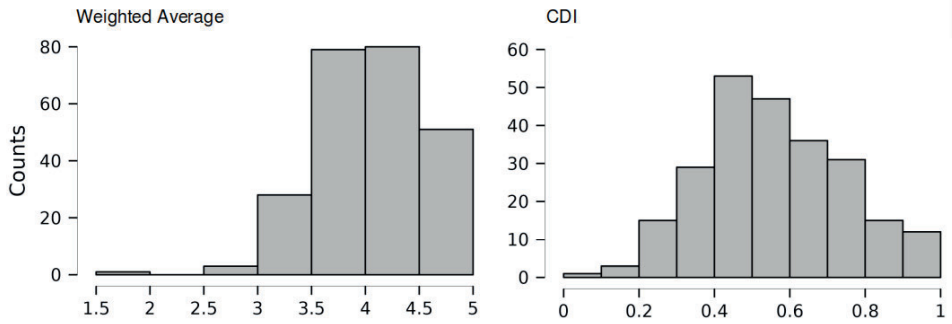


Figure 4. Histograms for untransformed Weighted Average, and transformed CDI

The CDI is the cubed weighted mean, divided by 125, ensuring a value bound between 0 and 1. Since the 50th and 75th percentiles of the CDI were .536 and .697 respectively, the index can be loosely interpreted in similar fashion to standard correlation coefficients, inasmuch as values of .50 or more indicate presence of CD, while .70 and above indicates strong CD. Following this logic, "CD Status" (CDS) can also be derived, as a simply indication of presence (or absence) of CD, based on a threshold CDI value of .50 or more. Table 9 operationalises all proposed outputs.

Output	*Mathematical notation*	*Spreadsheet formula*	*PSPP code*
C-For	*CFor* = F1 + F2 + … + F8 / 8	=average(*F1*:*F8*)	COMPUTE *CFor* = MEAN(*F1* TO *F8*). EXECUTE.
C-Def	*CDef* = D1 + D2 + … + D6 / 6	=average(*D1*:*D6*)	COMPUTE *CDef* = MEAN(*D1* TO *D6*). EXECUTE.
C-Vir	*CVir* = V1 + V2 + … + V7 / 7	=average(*V1*:*V7*)	COMPUTE *CVir* = MEAN(*V1* TO *V7*). EXECUTE.
CDI	*CDI* = (0.6**CFor* + 0.2**CDef* + 0.2**CVir*)^3/125	=((0.6**CFor*)+(0.2**CDef*)+(0.2**CVir*))^3/125	COMPUTE *CDI* = ((0.6 * *CFor*) + (0.2 * *CDef*) + (0.2 * *CVir*))^3 / 125. EXECUTE.
CDS	1 if *CDI*≥0.50 0 otherwise	=if(*CDI*>=.5, 1, 0)	COMPUTE *CD* = IF (*CDI* >= 0.5) 1 ELSE 0. EXECUTE.

Table 9. Operationalising CD outputs in spreadsheets and other software

Use of the CDS as a dummy variable denoting presence (= 1) or absence (= 0) of CD fits with the conceptual frameworks of cultural evolution, gene-culture co-evolution and dual-inheritance theorists. The mathematical models presented by Cavalli-Sforza and Feldman (1981), as well as Boyd and Richerson (1985), track cultural variants as proportions of individuals expressing them within a given population. In other words, a cultural evolutionary framework lends credence to the use of a single categorical variable denoting CD as a cultural variant (or set of cultural variants) that individuals in a population either do or do not possess.

Individual dimensions can also be transformed as *C-For*^{3}, *C-Def*^{3} and *C-Vir*^{3}, depending on the specific hypotheses researchers may wish to test. Caution is needed, however, since the dimensions should not be considered independent in the multivariate modeling context, and are expected to yield high collinearity. Individual dimensions should be interpreted in the context of overall CD. The interplay between dimensions, however, meanwhile raises additional potentially theoretically interesting possibilities for studying CD or partial CD. For instance, relatively high uptake of *C-Vir* was noted in the present sample. Taking the original dimension means from Table 7, "*Relative C-Vir*" can be calculated as a proportion (4.182 / [4.157 + 3.631 + 4.182]). Applying the basic standard error formula to the result of .35 implies that the relative contribution of *C-Vir* was statistically significant (*95% CI* = .348, .352), because $\pi \neq .33$. The concept of relatively dominant dimensions allows further classification of chivalric or partially chivalric types in the form of additional qualitative dummy variables. These further support population-level analyses and claims, and provide a convenient link between individual psychometric, and communal sociometric measurements.

Conclusion

A working definition follows from the analysis and interpretation of data. The CCC can be defined as a prevailing unified set of values in contemporary populations with cultural evolutionary roots extending at least as far back as, at least in the case of Western or Westernised cultures, the European Middle Ages in the form of the well-known code of chivalry adopted by Christian knights. More specifically, the CCC is

an evolving set of cultural variants comprising three mutually constitutive, inextricably linked dimensions, namely, *C-For*, *C-Def* and *C-Vir*. Cumulatively, these dimensions reflect the essence of an otherwise vast panoply of values reported by scholars of medieval chivalry, yet can still be observed and measured in contemporary settings in the form of the CCC and its uptake as CD. A selection of 21 items accompanied by five-point Likert scales were retained from the initial survey, and are offered as a working CD scale (presented fully and in their original order as Appendix 1). Suitable outputs of the scale are proposed in the form of a CDI, a continuous variable ranging from 0 to 1 as an overall estimate of CD, as well as CDS, a qualitative/dichotomous variable denoting presence (or absence) of CD. Caution should be exercised in considering alternative treatments of the data in the context of multivariate modeling, given that the dimensions were not independent, and high collinearity was noted. Individual dimensions, in this sense, should be understood in context of overall CD.

Limitations and Future Research

It should be noted that the study did not aim to examine the historical nature of medieval knighthood, but rather, to recognise its overt features and conceptualise them as an evolving cultural construct. Given that the participants were predominantly Maltese, limitations concerning the generalisability of the findings cross-culturally should also be considered. The Hospitaller Knights of St John were based on the islands for just over two and a half centuries until Napoleon's conquest of 1798 (Cohen, 2011; Attard, 2022). This provides Malta with the unusual distinction of being the last place on Earth to be governed by one of the three major medieval chivalric orders of Christian knights. It is only fitting, in some sense, that such a study be carried out in Malta, yet, only future research can investigate how CD varies systematically across cultures, sexes, genders, races and classes. In terms of sampling size, while 240 was set as a minimum threshold, it is similarly unclear how the results may have differed with the inclusion of a more participants. It should also be noted that, as with most self-report scales, participants may not answer truthfully, particularly when qualities are perceived as desirable. Nevertheless, CD is intended to measure the extent to which qualities are valued, and not enacted. How CD interacts with other values, mental states, behaviours and measurable outcomes, precisely underscores the importance of opening up new research avenues in this area.

With possible effects on mental states and interpersonal relationships, researchers may be interested in potential applications of CD in psychotherapeutic and social work contexts. Critical scholars may wish to hypothesise a role of CD in the priming of mass consent to social inequality and systemic injustices, as well as in receptivity to disinformation, propaganda and political rhetoric. Educational researchers might examine the prospective social learning and cultural transmission mechanisms at play in formal education systems that serve to perpetuate continuing evolution of the three dimensions of CD, by overt and tacit means alike. Political scientists and sociologists may be interested in the possibility of differential uptake of CD as a function of social class, exploring who might be disproportionately carrying the burden of chivalric duty, and who is exempt. CD might similarly interact with known cognitive biases in the context of rational consumer choice, extending its relevance to the field of economics. CD might similarly apply in experimental settings, as a predictor of strategy in the context of game theory. The study ultimately aims to advance and encourage scholarship on chivalry along all such lines, by laying groundwork for conceptualising the CCC as a culturally evolving construct assimilated in the form of CD, with implications and applications at individual and population levels, across the social sciences.

Kaynakça

Atkins, H. G. (1996). Chivalry of Germany. In: Prestage, E. (Ed.) *The History of Civilization: Chivalry – Its Historical Significance and Civilizing Influence*. New York: Routledge, pp. 93-126.

Attard, J. (2022). *The Knights of Malta*. Malta: BDL.

Balot, R. K. (2004). The Dark Side of Democratic Courage. *Social Research: An International Quarterly*, *71*(1), 73-106.

Banner, P. (2015). Knights in shining armor: The impact of the Middle Ages on the Modern Western perception of war. *Prologue: A First-Year Writing Journal*, *7*(1), 5-16.

Bartley, D. F. & Robitschek, C. (2000). Career Exploration: A Multivariate Analysis of Predictors. *Journal of Vocational Behavior, 56*(1), 63-81.

Barthélemy, D. (2018). Modern Mythologies of Medieval Chivalry. In *The Medieval World* (pp. 249-263). London: Routledge.

Bélanger, J. J., Schumpe, B. M., Nociti, N., Zeigler-Hill, V. & Shackelford, T. K. (2018) Self-sacrifice for a Cause: A Review and an Integrative Model. In: Zeigler-Hill, V. & Shackelford, T. K. (Eds.) *The SAGE Handbook of Personality and Individual Differences*, 465-485.

Bellamy, A. J. (2005). Is the war on terror just? *International Relations*, *19*(3), 275-296.

Boyd, R. & Richerson, P. J. (1985). *Culture and the Evolutionary Process*. Chicago: University of Chicago Press.

Boyd, R. & Richerson, P. J. (2011). *Not by Genes Alone: How Culture Transformed Human Evolution*. Chicago: University of Chicago Press.

Black, J. E. & Reynolds, W. M. (2016). *Development, reliability, and validity of the Moral Identity Questionnaire. Personality and Individual Differences, 97*(1), 120–129.

Cavalli-Sforza, L.L. & Feldman, M.W. (1981) Cultural Transmission and Evolution: A Quantitative Approach. *Vol. 16 of Monographs in Population Biology*.

Cohen, R. (2011). *Knights of Malta 1523 – 1798*. Malta: Wise Owl.

De Charny, G. (2005). A Knight's Own Book of Chivalry. In: Karras, R. M. & Peters, E. (Eds.) *The Middle Ages Series*. Philadephia: University of Pennsylvania Press.

Frantzen, A. J. (2004). *Bloody Good: Chivalry, Sacrifice, and the Great War*. Chicago: University of Chicago Press.

French, S. (2017). The Code of the Warrior: Ideals of Warrior Cultures Throughout History. *Journal of Character and Leadership Development*, *4*(1).

Gervais, K. (2014). This is my Sparta! 300 (1998), 300 (2007), and Three (2014). *Melbourne Historical Journal*, *42*(2), 3-20.

Goethals, G. R. & Allison, S. T. (2012). Making Heroes: The Construction of Courage, Competence, and Virtue. *Advances in Experimental Social Psychology, 46*(1), 183-235.

Grabe, M. E., Trager, K. D., Lear, M. & Rauch, J. (2006). Gender in crime news: A case study test of the chivalry hypothesis. *Mass Communication & Society*, *9*(2), 137-163.

Graham, S. (2013). Cities and the 'War on Terror'. In: *Indefensible Space* (pp. 1-28). Routledge.

Haag, M. (2014). *The Tragedy of the Templars: The Rise and Fall of the Crusader States*. UK: CPI Group.

Hamm, B. & Smandych, R. (2005). *Cultural Imperialism: Essays on the Political Economy of Cultural Domination*. Canada: Broadview Press.

Hearnshaw, F. J. C. (1996). Chivalry and its Place in History. In: Prestage, E. (Ed.) *The History of Civilization: Chivalry – Its Historical Significance and Civilizing Influence*. New York: Routledge, pp. 1-36.

Henneberry, S. (2008). Modern Leonidas: Spartan Military Culture in a Modern American Context. *Senior Honors Projects*. Paper 105.

Henrich, J. & Gil-White, F. J. (2001). The evolution of prestige: Freely Conferred Deference as a Mechanism for Enhancing the Benefits of Cultural Transmission. *Evolution and Human Behavior*, *22*(3), 165-196.

Henrich, J., Chudek, M. & Boyd, R. (2015). The Big Man Mechanism: How Prestige Fosters Cooperation and Creates Prosocial Leaders. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *370*(1683), 20150013.

Herman, E. S. & Chomsky, N. (1994). *Manufacturing Consent: The Political Economy of the Mass Media*. Vintage Books.

Jacob, E. F. (1996). The Beginnings of Medieval Chivalry. In: Prestage, E. (Ed.) *The History of Civilization: Chivalry – Its Historical Significance and Civilizing Influence*. New York: Routledge, pp. 37-62.

Kaeuper, R. W. (2005). Historical Introduction to the Text: A Knight's Own Book of Chivalry. In: Karras, R. M. & Peters, E. (Eds.) *The Middle Ages Series*. Philadephia: University of Pennsylvania Press.

Kateb, G. (2004). Courage as a Virtue. *Social Research: An International Quarterly*, *71*(1), 39-72.

Kim, H. Y. (2013). Statistical Notes for Clinical Researchers: Assessing Normal Distribution (2) using Skewness and Kurtosis. *Restorative Dentistry & Endodontics, 38*(1), 52-54.

Laland, K. N. (2017). *Darwin's Unfinished Symphony: How Culture Made the Modern Mind*. Princeton University Press.

Luengo Kanacri, B. P., Eisenberg, N., Tramontano, C., Zuffiano, A., Caprara, M. G., Regner, E., Zhu, L., Pastorelli, C. & Caprara, G. V. (2021). Measuring Prosocial Behaviors: Psychometric Properties and Cross-national Validation of the Prosociality Scale in Five Countries. *Frontiers in Psychology*, *12*(1), 693174.

MacCallum, R. C., Widaman, K. F., Zhang, S. & Hong S. (1999). Sample Size in Factor Analysis. *Psychological Methods, 4*(1), 84-99.

MacInnes, I. A. (2020). All I Ever Wanted Was to Fight for a Lord I Believed in. But the Good Lords Are Dead and the Rest Are Monsters": Brienne of Tarth, Jaime Lannister, and the Chivalric "Other. *Queenship and the Women of Westeros: Female Agency and Advice in Game of Thrones and A Song of Ice and Fire*, pp. 79-103.

McCarthy, B. (2022). Warrior values: A socio-historical Survey. In *Male violence* (pp. 105-120). Routledge.

Napier, G. (2017). *The A-Z of the Knights Templar: A Guide to their History and Legacy*. UK: The History Press.

Nicholson, H. (2010). *A Brief History of the Knights Templar*. Philadelphia: Running Press.

Norenzayan, A., Shariff, A. F., Gervais, W. M., Willard, A. K., McNamara, R. A., Slingerland, E. & Henrich, J. (2016). The Cultural Evolution of Prosocial Religions. *Behavioral and Brain Sciences*, *39*, e1.

Nowotny, J. (2016). The Human Shell: The Iron Man Armour as an Agent of Heroism. *Helden. Heroes. Héros*, *4*(1), 65-78.

OED (2023). *Oxford English Dictionary* [online]. Available online at:
https://www.oxfordlearnersdictionaries.com/

Peterson, C. & Seligman, M. E. P. (2004). *Character Strengths and Virtues: A Handbook and Classification*. New York: Oxford University Press.

Prestage, E. (1996). *The History of Civilization: Chivalry – Its Historical Significance and Civilizing Influence*. New York: Routledge.

Richerson, P., Baldini, R., Bell, A. V., Demps, K., Frost, K., Hillis, V., Mathew, S., Newton, E. K., Naar, N., Newson, L., Ross, C., Smaldino, P. E., Waring, T. M. & Zefferman, M. (2016). Cultural Group

Selection Plays an Essential Role in Explaining Human Cooperation: A Sketch of the Evidence. *Behavioral and Brain Sciences*, *39*, e30.

Saul, N. (2011). *Chivalry in Medieval England*. Harvard University Press.

Scaglione, A. (2023). *Knights at Court: Courtliness, Chivalry, and Courtesy from Ottonian Germany to the Italian Renaissance*. California: University of California Press.

Shears, F. S. (1996). The Chivalry of France. In: Prestage, E. (Ed.) *The History of Civilization: Chivalry – Its Historical Significance and Civilizing Influence*. New York: Routledge, pp. 64-92.

Schwartz, S. H. (2012). An Overview of the Schwartz Theory of Basic Values.

Online Readings in Psychology and Culture, 2(1).

Souza, J. & Bingham, P. M. (2019) The New Human Science: Sound, New Evolutionary Theory GIves Us Ultimate Causal Understanding of Human Origins, Behavior, History, Politics, and Economics. In: Wilson, D. S., Geher, G., Mativetsky H. & Gallup, A. C. (Eds.) *Darwin's Roadmap to the Curriculum: Evolutionary Studies in Higher Education*. Oxford University Press, New York, USA, pp. 117-156.

Takeda, S. (2021). Chivalry and Bushido, the Samurai code (Pre-print). Available at: file:///home/matthew/Downloads/preprints201812.0118.v3.pdf

Terry-Roisin, E. A. (2019). Chivalry, Renaissance Concept of. In: M. Sgarbi (ed.), *Encyclopedia of Renaissance Philosophy*. UK: Springer.

Viki, G. T., Abrams, D. & Hutchison, P. (2003). The "True" Romantic: Benevolent Sexism and Paternal Chivalry. *Sex Roles, 49*(9/10), 533-538

West, C., Baker, A., Ehrich, J. F., Woodcock, S., Bokosmaty, S., Howard, S. J., & Eady, M. J. (2020). Teacher Disposition Scale (TDS): Construction and Psychometric Validation. *Journal of Further and Higher Education*, *44*(2), 185-200.

Wheaton, B., Muthen, B., Alwin, D. F. & Summers, G. F. (1977). Assessing Reliability and Stability in Panel Models. *Sociological Methodology, 8*(1), 84–136.

APPENDIX 1 – Chivalric Disposition Scale

The Chivalric Culture Complex (CCC) is a prevailing, culturally evolving set of values comprising three mutually constitutive, inextricably linked dimensions, namely, Chivalric Fortitude (*C-For*), Chivalric Deference (*C-Def*) and Chivalric Virtue (*C-Vir*). In conjunction, these dimensions explain the higher-order, overarching construct of Chivalric Disposition (CD), capturing the essence of an otherwise vast panoply of values associated with medieval chivalry, yet still observable and measurable in contemporary settings. Each item is accompanied by a five-point linear scale, where 1 = Strongly Disagree, and 5 = Strongly Agree.

1. It is important for me to always champion good against evil.
2. It is important for me to be that person others know will never steal, cheat or lie.
3. It is important for me to be able to forgive, when I have the power to do so.
4. It is important for me to be modest about my accomplishments, and never boast or brag.
5. It is important for me to choose honour and self-respect over money or possessions.
6. It is important for me to be loyal and obedient, and show respect for authority.
7. It is important for me to be modest in my appearance, and avoid extravagant clothes or adornments.
8. It is important for me to follow the rules, even when they don't make immediate sense.
9. It is important for me to be impartial and fair in my treatment of others, whoever they are and whatever the stakes.
10. It is important for me to be ready, willing and able to use force in self-defence when necessary.
11. It is important for me to be resolute and staunch in completing my duties, no matter what.
12. It is important for me to act in a way that supports a general state of order and obedience.
13. It is important for me to be the one who shows mental or moral strength in moments of extreme difficulty.
14. It is important for me to protect those who can't protect themselves.
15. It is important for me to be ready and willing to endure hardship to uphold a strong belief.
16. It is important for me to have exceptional self-control and self-discipline.
17. It is important for me to stay strongly committed to supporting a person or group I have promised my loyalty to.
18. It is important for me, if unsure, to give my superiors the benefit of the doubt.
19. It is important for me to behave with seriousness of manner, appearance and language.
20. It is important for me to be exceptionally strong in mind and spirit.
21. It is important for me to never behave in a dishonest way just to get what I want.

C-For *(F1, F2, …, F8)* = 10 + 11 + 13 + 14 + 15 + 16 + 17 + 20
C-Def *(D1, D2, …, D6)* = 6 + 7 + 8 + 12 + 18 +19
C-Vir *(V1, V2, …, V7)* = 1 + 2 + 3 + 4 + 5 + 9 + 21

Output	***Mathematical notation***	***Spreadsheet formula***	***PSPP code***
*C-For**	*CFor = F1 + F2 + … + F8 /* 8	=average(*F1*:*F8*)	COMPUTE *CFor* = MEAN(*F1* TO *F8*). EXECUTE.
*C-Def**	*CDef = D1 + D2 + … + D6 /* 6	=average(*D1*:*D6*)	COMPUTE *CDef* = MEAN(*D1* TO *D6*). EXECUTE.
*C-Vir**	*CVir = V1 + V2 + … + V7 /* 7	=average(*V1*:*V7*)	COMPUTE *CVir* = MEAN(*V1* TO *V7*). EXECUTE.
CD Index (CDI)	*CDI* = (0.6**CFor* + 0.2**CDef* + 0.2**CVir*)^3/125	=((0.6**CFor*)+(0.2**CDef*)+(0.2**CVir*))^3/125	COMPUTE *CDI* = ((0.6 * *CFor*) + (0.2 * *CDef*) + (0.2 * *CVir*))^3 / 125. EXECUTE.
CD Status (CDS)	1 if *CDI*≥0.50 0 otherwise	=if(*CDI*>=.5, 1, 0)	COMPUTE *CD* = IF (*CDI* >= 0.5) 1 ELSE 0. EXECUTE.

** For use in parametric statistical procedures variables should be raised to the third power (C-For^3, C-For^3 & C-Vir^3).*